ACCESSIBLE PEDESTRIAN SIGNAL OPERATION AND INSTALLATION MANUAL

(31 PAGES)

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4 Wire Navigator Accessible Pedestrian Signal Operation and Installation Manual

The 4 Wire Navigator System from Polara Engineering is an improved replacement for our original Navigator. It provides a vibro-tactile arrow button and audible signals to give pedestrians valuable crossing information in alternative formats. The design is based on the 2 Wire Navigator and has much in common with that system.

The primary intended use for the 4 Wire Navigator is in locations where only one or two crosswalks of an intersection are being installed, there are no pedestrian pushbuttons and the pedestrian signals are cycled automatically or the 2 wire system was not usable due to poor/inadequate field wiring.

For each Pushbutton Station there is one Ped Head mounted Control Unit required. The Control Unit is typically installed inside a pedestrian signal head, and connects to the Walk and Don't Walk 115 VAC light wiring. The output side of the board connects via 4 wires to the Pushbutton Station.

All setup options for the Pushbutton Station are accomplished with the Configurator, a handheld remote unit. It allows you to select sounds for each "Don't Walk", "Walk", and "Clearance" phase of the pedestrian signal cycle, plus custom information and sounds if they have been programmed in.

While the 4 Wire Navigator is primarily intended for locations without pushbutton wiring, it does accept pushbutton wires and will transmit a pedestrian call to the intersection controller.

The system comes from the factory pre-setup with settings used for typical intersections. However, the available options allow customizing for virtually all situations.

Please carefully read the contents of this manual in its entirety so you fully understand the many functions and options the system provides.

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Standard Features

- Independent minimum & maximum volume settings for Locate Sounds, Clearance & Walk Sounds, and extended button push. Separate minimum volume setting for information message.
- Optional clearance sounds or audible countdown of remaining seconds during clearance available; compliments or replaces visible countdown displays
- Secure configuration prevents unauthorized tampering.
- Button rated for 20 million+ operations with < 3 lb. actuation force.
- Maximum volume dynamic range 60 dB.
- Optional announcement of direction of travel (Ex: "traveling west") can be added (in field) to location message.
- Adjustable extended push time from 0 to 6 seconds in .5-second increments can be set by installer.

Custom Message and Sound Options

- Custom Locate Sound - Plays a sound at selectable interval to assist a visually impaired pedestrian in locating the Push Button Station.
- Custom Information Message(s) - Typically gives street being crossed with cross street, and other vital information. Up to three different languages can be programmed in (must be specified at time of order).
- Custom Walk Message(s) - Typically gives name of street the pedestrian is crossing. Up to three different languages can be programmed in (must be specified at time of order).
- Custom Clearance Sounds/Countdown - Plays a sound to let pedestrian know they should clear intersection crosswalk. This optional tone typically would sound similar to the locate sound but is played at a faster rate or counts down the number of seconds in the clearance phase. Up to three different languages can be programmed in.

Specifications

Push Button Station
See product drawing/specification N45AN0-X

Navigator Ped Head Control Unit
See product drawing/specification PHCU4W

4 Wire Navigator System (System)

Push Button Station (PBS)

The PBS is the pedestrian interface to the Navigator system. All sounds emanate from the PBS. A Locate Tone is typically always playing during the Don't Walk phase. The locate tone is what the visually impaired pedestrian listens for to locate the PBS. Both a momentary or extended button push will be registered by the PBS by the latching on of the LED on the front of the PBS. If the unit has been programmed with custom voice messages the pedestrian can activate a Location Message with an extended push of the button. The system can provide, based on how long the button is pushed, custom messages in up to three different languages (must be specified at time of order).

Configurator

The Navigator Configurator is a hand held remote used for configuring the Navigator System. Complete system configuration is performed with this remote. Just stand within a few feet in front of a PBS, point the Configurator at the PBS, turn it on and select your options. The Configurator communicates via infrared with the PBS. One Configurator is all you need for maintaining multiple intersections! All of the configuration options in the PBS are set with the Configurator. The beauty of the Navigator system is its interactive operation. For example, if you select one of the optional Locate Sounds you hear your choice as you select it! When adjusting volume levels you hear the level you select! **Note: Direct sunlight on the infrared windows of either the Configurator or Pole Unit can impair communication. Providing shade while using the Configurator may be necessary.**

Ped Head Control Unit (PHCU4W)

The PHCU4W is installed inside the pedestrian Walk/Don't Walk lighted sign associated with the Push Button Station (PBS). Two mounting brackets are provided with a variety of holes to facilitate mounting in most common ped head types. Note: The Control Unit will not fit in old dual transformer neon light ped heads. The input terminals connect to the 115VAC ped head light wiring, and the output terminals connect to the PBS. The output voltage is typically 18VDC.

System Installation

Please read these installation instructions completely before beginning an installation.

Overview

Installation involves installing the PHCU4W in the pedestrian heads and the PBS's in the field. A 4 wire cable Belden 8489 or equivalent must be routed between each PBS and its associated PHCU4W. The PBS's replace any existing pedestrian push buttons mounted on poles, and connect to the push button wires, if available, in addition to the 4 wires from the PHCU4W. Note: Each PBS is supplied with a permanent four conductor cable that is designed to be connected to the wires from the PHCU4W via silicone filled insulation displacement butt connectors (3M Scotchlock UAL - Polara P/N: 801-540) supplied by Polara. The wire from the PHCU4W to the PBS cannot be larger than #18 AWG standard wires. Polara stocks the Belden 8489 cable so you can purchase it from Polara.

If the cable needs to be routed from one pole through underground conduit to another pole (ped head and associated button are not on same pole), to install an eight (8) push button system will take a 2 man crew 8-12 hours (assuming no complications). To install an eight push button system when the ped heads are on the same pole will take a 2 man crew 8 hours or less.

Installation

INSTALLING PUSH BUTTON STATIONS ON POLES

Determine if Navigator PBS's have special messages. If there is a label on the back with street names, then they have special messages. Determine location for each per the street being crossed.

The recommended button height from the ground to the center of the push button is 39" maximum. It can be lower, but should not be higher.

Note: The visually impaired use the face of the push button station and the arrow on the button to determine the direction of travel. The arrow should point across the street in the direction of travel and, when mounted, the sign of the PBS should be parallel with the crosswalk. You can tell the unit is mounted correctly by placing the outside of your forearm against the sign (or front of the unit) with your fingers straight. Your arm should be parallel to the crosswalk and point to where the crosswalk ends across the street.

Place Intersection in ped recall.

Remove existing push buttons from poles.

Route 4 wire cable from each ped head to its associated push button pole.

Remove the sign from each PBS by removing the 4 screws holding the sign. If the arrow direction is correct there is no need to open the unit. If the arrow needs to be changed or the voice chip changed, remove the 6 cover screws and carefully bring the cover to approximately 60° which frees the bottom hinge, then remove the cover. Place the cover on a flat surface with the backside facing you. Slowly press on the front of the button and turn the button diaphragm counter-clockwise. The button diaphragm assembly should pop out. Orient the arrow in the proper direction. Place the diaphragm so the corner of each tab goes under each of the 4 screws. Push and turn the button diaphragm until it snaps into each cavity with the corner of each tab under the screws. Reinstall cover and six screws. **Be careful not to drop the cover and break the hinge; this will prevent proper moisture sealing and void the warranty. Also keep it away from metal pole or other metal objects. The magnet will pull the diaphragm assembly out and possibly damage it if it comes too close to other metal objects.**

Hold the PBS against the pole in the proper orientation (as described earlier) and mark on the pole for the two mounting holes (these are on 6" centers). Drill and tap them to ¼-20 thread.

If there are button wires going back to the traffic control cabinet, approximately 3 3/8" (3.44") below the bottom ¼-20 hole a wire exit hole is needed. If a push button frame was on the pole this hole may already exist. If a hole does not exist, drill a 5/8" minimum diameter hole. Note: Template is attached to the back of this manual. **Do not drill with unit open near pole. Magnets on speaker and button will attract shavings potentially causing problems.**

See exhibit at end of procedure before performing following step. Slide rubber boot over button wires. Connect button wires to terminals observing polarity (Do not use crimp on forks, they interfere with the rubber boot). Bend wires 90° to unit. Apply silicone to boot edge, then press boot into round cavity on back of PBS so that bellows portion collapses inward. Apply tape to wires then onto boot so boot is held firmly to the wires in this position. Make sure wires are well taped and sealed so water cannot follow wires into boot and terminal block area.

Bolt PBS to pole using two ¼-20 bolts and washers provided. Tighten until secure on pole.

Connect the four wires of the PBS cable to the four wires routed to the PHCU4W (observing correct hookup) and splice them together using the Polara supplied silicone filled butt connectors.

WOOD/CONCRETE POLE MOUNT

If the PBS is going to be mounted on a wooden pole, see two options on pages 25-26.

INSTALLING CONTROL UNITS IN PED HEADS

Mount PHCU4W in each ped head using the provided mounting brackets and hardware. See diagrams/photos for typical mounting.

Refer to the wiring diagram. Connect the 4 wires between the PBS and PHCU4W to the terminals on the PHCU4W. Double check for correct hookups.

Warning: The following WALK and DON'T WALK wiring connects to AC line voltage and is dangerous. It is recommended that the intersection be placed in flash or turn off PED signals while connections to these signals are made. Refer to the wiring diagram and connect ped sign Ground, Common, Walk, and Don't Walk to input side of PHCU4W.

Return the traffic signal controller or ped heads to normal operation.

Install the PBS covers temporarily with two screws. Test the system for proper operation. Check each PBS per the Operational Check below.

System Operational Check

Following installation and the application of power, check the following:

1. The pole unit should start playing the locate tone within about 5 seconds of power up. This assumes the unit is in DON'T WALK mode.

2. Push each PBS and verify that the red LED above the push button turns on with the first push, and that a tick is heard for each push. If button wires to the traffic controller exist, verify that the PED call is transmitted to the traffic signal controller.

3. Following a button push, verify that a walk message is heard and the push button vibrates during the next walk cycle.

4. Confirm the proper sound plays during clearance. If unit is set for countdown during the first clearance cycle, after power on, the unit should be silent. During the second or later cycle, the pole unit should play a voice countdown of the seconds remaining to end of clearance.

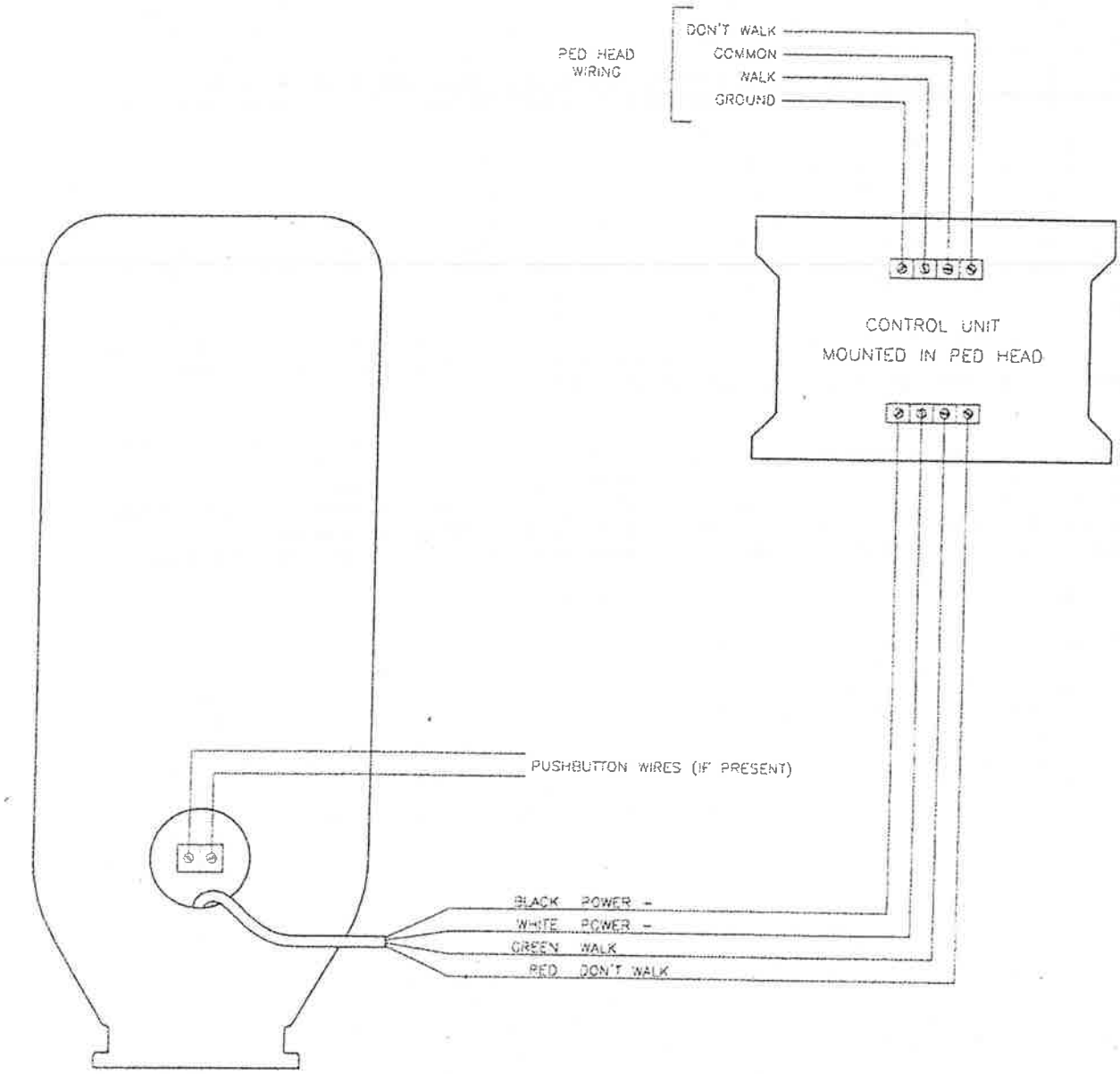
5. Proceed to Configuration. Once all units are configured as desired, recheck each for a full cycle to ensure all options and features operate as desired.

   When you are satisfied that all units are working properly, install sign on each PBS.

   Evaluate sound levels and responsiveness to ambient noise.

   Using the Configurator, make any volume adjustments as needed to each PBS.

4 WIRE NAVIGATOR WIRING DIAGRAM



System Configuration

Configuring the Navigator System is easy to learn due to the simple user interface. The best way to understand the Navigator System is to read the descriptions of each option that follows, write down your preferences for each (if you have one), then actually step through each choice on the Configurator. Keep in mind that the majority of installations will typically require few configuration changes from the factory defaults. But, the wide range of configuration options is made available to adapt to special intersection needs.

Configurator Power Up and Communications

After pressing the Configurator POWER button the Configurator performs a display test then displays the Software Version. Then the Configurator will display "Searching for Pole Unit" and attempt to communicate with the PBS. If you are just practicing and learning the Configurator and are not pointing it at a PBS, wait until it says "Press Either Read Settings", then press Push Button Station Read Settings keypad. This will bring you to the first option "Locate Vol Min". Pushing the Yes/No keys will show you that option's setting choices. Pushing the Menu Down/Menu Up keys will take you through the other options in descending or ascending order. **Note: If you do not press a button within a 30 second period, the Configurator will turn itself off.**

If you are actually programming a PBS, stand 1-3 feet in front of it, point the Configurator at it and push the Power button. You will see it list the same messages as above. As long as you are standing in front of the PBS within a 5' range communications will normally be maintained. **Note: Direct sunlight on the infrared windows of either the Configurator or Pole Unit can impair communication. Providing shade while using the Configurator may be necessary.**

If the link is successful then you will be prompted with:

"ENTER SECURITY CODE AAAA" (Default is "AAAA")
A 4 character code is required to access the functions of the Configurator. The Security Code can be both Alpha and or Numeric providing you with over 1.6 million possible combinations. The purpose of the Security Code is so that each municipality can maintain full control without any concerns of tampering. If for some reason the Security Code is forgotten or lost, call Polara Engineering for instructions on how to proceed. Press <YES and NO> to change the character over the cursor. Press UP or DOWN to move the cursor. When the cursor is under the 4th character, the DOWN key will submit your entry. Following a code match, you have the next option.

CHANGE SECurity CODE?
Press <YES to enter a new security code or NO> to skip. The purpose of this option is to change the Security Code to a code of your choice. It is recommended that the Code be set to something that would be difficult for someone to guess. The new code is entered as above and saved by pressing the DOWN key at the 4th character. Make a note of your code BEFORE you save it. The code is held in the PBS for that intersection, not the Configurator. Thus any Configurator can be used, but the security code must be changed at each PBS.

PBS Software Version
The Configurator will briefly display the software version number for the PBS you are communicating with. This will allow you to verify that the Configurator and PBS are compatible with each other. Contact Polara for any known compatibility issues.

Configuring the Navigator Push Button Station

Special Notes:

1. The Configurator has a built in shortcut which can make it easier to go from station to station and establish communication. Whenever the display shows "PRESS EITHER READ SETTINGS", you can walk over to another station and press the UP key. Alternatively you can press the power key, turn the Configurator off, then turn it on again.

2. Due to the limited number of characters that can be displayed on the Navigator Configurator LCD, some of the descriptions are abbreviated but are spelled out for clarity in this document. For example the function EXTENDED PUSH WALK VOLUME MINIMUM, is abbreviated to EXT WALK VOL MIN on the LCD display and EXTended (Push) WALK VOLume MINimum in this document. Note the word (Push) is inserted in parenthesis to further improve clarity.

3. As you move through the options, only those options where a setting was changed using the left and right buttons are flagged for update. If you want a particular setting updated, you must change the setting, even if you change it back to its previous value. This method reduces the amount of data and hence the time required to perform the update. **No setting changes are saved until the update function is performed by pressing the UPDATE key. If you lose communications before updating, everything you changed will be lost.**

VOLUME SETTINGS

The volume levels are entered as a percent from 0% to 100%. The volume difference between 0% and 100% is 60dB. The steps are 5% which represents a volume change of 3dB.

LOCATE VOLume MINimum

This function adjusts the minimum level that the LOCATE Sound will be played at. The Auto Volume adjustment will not go below this setting.
This volume level is adjustable from 0% to 75% of the maximum volume output in 5% steps. (16 choices)
(Default = 10%)

Pressing the MENU DOWN button at the desired choice will remember your choice and move on to the next menu item. You can also push Menu Up key and work backwards through the list.

LOCATE VOLume MAXimum

This function adjusts the maximum level that the LOCATE Sound will go up to. The Auto Volume adjustment will not go above this setting.
This volume level is adjustable from 25% to 100% of the maximum volume output in 5% steps. (16 choices)
(Default = 80%)

INFOrmation MeSsaGe VOLume MINimum

This function adjusts the minimum level for the information message. The message will never play at less than this level, which can be set from 0% to 100% in 5% steps. (21 choices)
(Default = 60%)

STandarD WALK VOLume MINimum
This function adjusts the minimum volume level for the WALK Sound. The Auto Volume adjustment will not go below this setting.
This volume level is adjustable from 0% to 75% of the maximum volume output in 5% steps. (16 choices)
(Default = 40%)

STandarD WALK VOLume MAXimum
This function adjusts the maximum volume level for the WALK Sound. The Auto Volume adjustment will not go above this setting.
This volume level is adjustable from 25% to 100% of the maximum volume output in 5% steps. (16 choices)
(Default = 80%)

EXTended (Push) WALK VOLume MINimum
This function adjusts the minimum volume level for the WALK Sound following an extended push. The Auto Volume adjustment will not go below this setting.
This volume level is adjustable from 0% to 75% of the maximum volume output in 5% steps. (16 choices)
(Default = 70%)

EXTended (Push) WALK VOLume MAXimum
This function adjusts the maximum volume level for the WALK Sound following an extended push. The Auto Volume adjustment will not go above this setting.
This volume level is adjustable from 25% to 100% of the maximum volume output in 5% steps. (16 choices)
(Default =100%)

VOLume OVER AMBIENT
This function is at the heart of the Auto Volume adjustment. The output volume level will be played relative to the measured ambient sound pressure but constrained within the set Minimum and Maximum settings. This compensation function is adjustable from 0dB to 20dB over ambient in 5dB steps.
(Default = 0dB)

WALK PHASE SOUND OPTIONS

WALK MODE SOUND
This function selects the preferred sound played during the Walk phase.
The following 9 choices are as follows:
NONE, CUCKOO (North/South), CHIRP (East/West), STandarD (Verbal Walk) MesSaGe, CUSTOM (Verbal Walk) MesSaGe, CUCKOO + STandarD (Walk Message), CUCKOO + CuSToM (Walk Message), CHIRP + STandarD (Walk Message), CHIRP + CuSToM (Walk Message).
(Default = STandarD (Walk) MesSaGe)

WALK SOUND PAUSE
This function selects the length of silence between the WALK Sounds.
The 13 choices are as follows:
.5 second to 3 seconds in .5 second steps and 3-10 seconds in 1 second steps.
(Default = .5 Second)

WALK SOUND TRIGger
This function selects the condition that will play Walk Sounds at the next pedestrian walk cycle. The choices are:
ALWAYS ON (Recall Mode Conditions - Plays every walk cycle)
ANY PUSH (Short or Extended Button Push)
EXTended PUSH (Extended Push Only) **Note: Do not use Extended Push on crosswalks set to rest in walk. If a blind person does not push and hold the button, and if a car never triggers the cross street, they could not get a walk indication.**
(Default = ANY PUSH)

SOUND/VIBration TIMER
This function selects the number of times (1, 2 or 3) or the length of time in seconds the WALK Sound or Message is played. Use this function to limit the sound time for Rest in Walk situations.
Note: Do not use 1, 2 or 3 if PBS revision is 1.10 or earlier.
The choices are:
FULL WALK (Duration)
1, 2 or 3 for walk message to play 1, 2 or 3 times if walk time allows.
4 SECONDS to 50 SECONDS, allows setting exact play time for time greater than 4 seconds.
(Default = FULL WALK)

SOUND/VIBration RETRIGger
This function is primarily used when Menu Item SOUND/VIB(ration) TIMER timeout is not set for FULL WALK and is intended for use in intersections set to Rest in Walk. It is also important in the following situation: If the walk sign is able to turn on without a button push (Recall Mode) and the Walk Sound Trigger option is NOT set to Always On, the locate tone will continue into the walk phase, just like a Rest in Walk timeout. The choices below determine the response to a button push while the locate tone is playing during the walk phase. The choices are:
(A New) BUTTON PUSH - Typically used in Rest in Walk situations. Sound starts immediately with button push.
(A) NEW WALK (Phase) - After timeout, a new WALK Phase is required before the next WALK Sound or Message is played which is also complemented with the vibrator.
(Default = BUTTON PUSH)

CANCEL ON CLeaRaNCE
This function gives the choice to cancel or complete the WALK Sound or Message when the intersection timing changes from the Walk Phase to the Clearance Phase. This function is primarily applicable where walk messages are quite long.
WARNING: It must be carefully examined before turning this function off since it can falsely extend the Walk Cycle Sounds into the Clearance Cycle time. Regulations may not allow this function so changing the default must be carefully considered.
The choices are: YES, NO
(Default = YES, cancels walk message upon start of clearance phase)

<u>CLEARANCE PHASE SOUND OPTIONS</u>
CLEARance MODE SOUND
This function allows the choice of a few standard Clearance Sounds, a customer specified tone or verbal Clearance Countdown. Note: The Countdown function is tied into the language options. The Countdown language will be in the same language the pedestrian selects when performing an extended push.
The choices are: NONE, TONE 1, TONE 2, TONE 3 (CuSToM), COUNTDOWN
(Default = COUNTDOWN)

CLEARance TONE PAUSE
This function selects the length of silence between the CLEARANCE Sounds.
The following 11 choices are as follows:
STANDARD, .5 SECONDS TO 5 SECONDS IN .5 SECOND STEPS
(Default = STANDARD, 1 sec)

DON'T WALK PHASE SOUND OPTIONS

LOCATE SOUND
This function allows the choice of a few standard LOCATE Sounds or a customer specified tone.
The choices are:
NONE, TONE 1, TONE 2, TONE 3 (CuSToM)
(Default = TONE 1)

LOCATE TONE TIME
This function selects the start to start repetition time of the LOCATE Sounds.
The following 11 choices are as follows:
STANDARD, .5 SECOND TO 5 SECONDS IN .5 SECOND STEPS
(Default = STANDARD, 1 sec)

PLEASE WAIT MeSsaGe
This option, when set to YES, replaces the locate tone following a button push with a verbal "WAIT", which plays every four seconds. This function is also supported by the second and third language options. Following the next Walk/Clearance Cycle, the normal locate tone resumes. **(NOTE: You cannot use this function if Walk sound trigger is set to extended push.)**
The choices are: YES, NO
(Default = NO)

INFORMATIONAL MESSAGE OPTIONS

DIRECTION MesSaGe
This function can be setup to give the visually impaired pedestrian more information about the direction they are traveling without having to use a Custom Message. For example if there is no custom Informational Message, an extended push can be selected to say "Traveling North".
The word "Traveling" will precede the following choices:
NORTH, NORTHEAST, EAST, SOUTHEAST, SOUTH, SOUTHWEST, WEST, NORTHWEST
(Default = NORTH)

INFOrmational MESSAGE
It is typically a custom message that gives visually impaired pedestrians information about where they are and where they are heading.
The following choices are:
NONE, DIRECTION, CUSTOM, CuSToM + DIRection
(Default = NONE)

CANCEL ON WALK
This function gives the choice to cancel or complete the INFORMATIONAL MESSAGE immediately when intersection timing changes to the Walk Phase while playing the INFORMATIONAL MESSAGE.
WARNING: It must be carefully examined before turning this function off since it can falsely shorten the Walk Cycle.
The choices are: YES, NO
(Default = YES, information message stops when WALK begins)

EXTended PUSH TIME
This function allows the EXTENDED PUSH TIME to be changed. This is the amount of time the Button on the PBS has to be pressed and held before enabling the Extended Push functions.
The choices are: 0-6 SECONDS IN .5 SECOND STEPS.
(Default = 2.5 Seconds)

SECOND & THIRD LANGUAGE OPTIONS

SECOND LANGUAGE
This function allows a SECOND LANGUAGE to be played for the Informational Message, Walk Message and Countdown. This language is a custom option.
For example if the second language has been programmed in Spanish and enabled, the pedestrian can access the language options by performing an Extended Push. The primary language would be stated first then the secondary language. "English", pause, "Spanish" (spoken in Spanish), pause, "English", etc... The pedestrian releases the button after they hear the language of choice. The Informational Message is immediately played in the selected language. The Walk Message and Countdown will also be played in the selected language. Walk phases following this walk cycle will revert to the default primary language.
The choices are: YES, NO
(Default = NO)

THIRD LANGUAGE
This function allows a THIRD LANGUAGE to be played for the Informational Message, Walk Message and Countdown. All three of these messages are custom options.
For example if all three of these custom messages have been programmed, the primary in English, the second in Spanish and third in Chinese. The pedestrian can access the language options by performing an Extended Push. The primary language would be stated first then the secondary language, then the third language. "English", pause, "Spanish" (spoken in Spanish), pause, "Chinese" (spoken in Chinese), pause "English", etc... The pedestrian releases the button after they hear the language of choice. The Informational Message is immediately played in the selected language. The Walk Message and Countdown will also be played in the selected language. Walk phases following this walk cycle will revert to the default primary language.
The choices are: YES, NO
(Default = NO)

Help Function
The Help function is quite basic, but can get you familiar with what all the buttons do on the Configurator keypad.
Press the HELP button at any time to get a description of what a particular button does. The button description will be scrolled on the display. Pressing HELP button again will return the display back where it was prior to pushing the HELP button.

Display Contrast Adjust
Press the MENU UP & MENU DOWN button simultaneously. Then press left arrow to dim the display and press right arrow to brighten display. Press any other buttons to exit the Display Contrast screen.

Restore Factory Settings

If for some reason you need to restore the factory default settings, turn on the Configurator and establish communications with the PBS. Enter Security Code and Menu Down through the ID number. You will get a "PRESS EITHER READ SETTINGS" message. To restore the factory settings, press Update Settings for push button station.

General Configurator Operational Notes

The Configurator has an automatic shut off function. As long as the Configurator has an established Communication connection with the PBS, the Configurator will not shut off. The Auto Shut Off timer is reset every time there is Configurator Communications or any button is pressed. If neither of these conditions happen within a 30 second period, the Configurator will Auto Shut Off. The Configurator may be shut off manually by pressing the POWER button. This gives a YES/NO option to power off. This function is active after you see a "PRESS EITHER READ SETTINGS". Selecting NO will return to "PRESS EITHER READ SETTINGS".

You may menu up or down through the choices as many times as needed, but nothing will be saved, unless the UPDATE SETTINGS button is pressed!
The Configurator Communication Link can be broken for up to 15 seconds, after that the PBS will return to normal operation and all menu choice settings within the Configurator will be lost.

CONFIGURATOR BROWSE MODE

The Browse Mode is simply to allow a user to acquaint themselves with the Configurator at their desk or anywhere. To enter this mode just power up the Configurator. You will see the following messages: "SEARCHING FOR POLE UNIT…" "NO COMM LINK", "BROWSE MODE" and "PRESS EITHER READ SETTINGS". At this time you should press the Push Button Station Read Settings button. You can scroll through the menus and choices to familiarize yourself with the powerful capabilities of the Navigator APS system.

Default and Field Settings

City _____ State/Province _____ Install Date _____

Intersection: _____

Street: _____ _____ _____ _____ _____ _____ _____ _____

Corner: _____ _____ _____ _____ _____ _____ _____ _____

ID: _____ _____ _____ _____ _____ _____ _____ _____

Phase: _____ _____ _____ _____ _____ _____ _____ _____

	Defaults (Effective with Configurator v1.12, Nav2 v1.17 and Nav4 v1.15)								
LOCATE VOL MIN	10%								
LOCATE VOL MAX	50%								
INFO MSG VOL MIN	60%								
STD WALK VOL MIN	40%								
STD WALK VOL MAX	70%								
EXT WALK VOL MIN	70%								
EXT WALK VOL MAX	80%								
VOL OVER AMBIENT	0 dB								
WALK MODE SOUND	STD MSG								
WALK SOUND PAUSE	.5 SEC								
WALK SOUND TRIG	ANY PUSH								
SOUND/VIB TIMER	FULL WALK								
SOUND/VIB RETRIG	BTN PUSH								
CANCEL ON CLEARANCE	YES								
CLEAR MODE SOUND	TONE 1								
CLEAR TONE PAUSE	1 SEC								
LOCATE SOUND	TONE 1								
LOCATE TONE TIME	1 SEC								
PLEASE WAIT MSG	NO								
DIRECTION MSG	NORTH								
INFO MESSAGE	NONE								
CANCEL ON WALK	YES								
EXT PUSH TIME	1.0 SEC								
SECOND LANGUAGE	NO								
THIRD LANGUAGE	NO								
EXT PUSH PRIORITY	NO								
WALK PING PONG	NO								
CLEAR PING PONG	NO								

Special Notes: _____

_____

_____

_____

Default and Field Settings (page 2 for islands)

	ID:	_____	_____	_____	_____
	Phase:	_____	_____	_____	_____
	Defaults				
LOCATE VOL MIN	10%	_____	_____	_____	_____
LOCATE VOL MAX	50%	_____	_____	_____	_____
INFO MSG VOL MIN	60%	_____	_____	_____	_____
STD WALK VOL MIN	40%	_____	_____	_____	_____
STD WALK VOL MAX	70%	_____	_____	_____	_____
EXT WALK VOL MIN	70%	_____	_____	_____	_____
EXT WALK VOL MAX	80%	_____	_____	_____	_____
VOL OVER AMBIENT	0 dB	_____	_____	_____	_____
WALK MODE SOUND	STD MSG	_____	_____	_____	_____
WALK SOUND PAUSE	.5 SEC	_____	_____	_____	_____
WALK SOUND TRIG	ANY PUSH	_____	_____	_____	_____
SOUND/VIB TIMER	FULL WALK	_____	_____	_____	_____
SOUND/VIB RETRIG	BTN PUSH	_____	_____	_____	_____
CANCEL ON CLEARANCE	YES	_____	_____	_____	_____
CLEAR MODE SOUND	TONE 1	_____	_____	_____	_____
CLEAR TONE PAUSE	1 SEC	_____	_____	_____	_____
LOCATE SOUND	TONE 1	_____	_____	_____	_____
LOCATE TONE TIME	1 SEC	_____	_____	_____	_____
PLEASE WAIT MSG	NO	_____	_____	_____	_____
DIRECTION MSG	NORTH	_____	_____	_____	_____
INFO MESSAGE	NONE	_____	_____	_____	_____
CANCEL ON WALK	YES	_____	_____	_____	_____
EXT PUSH TIME *	1.0 SEC	_____	_____	_____	_____
SECOND LANGUAGE	NO	_____	_____	_____	_____
THIRD LANGUAGE	NO	_____	_____	_____	_____
EXT PUSH PRIORITY	NO	_____	_____	_____	_____
WALK PING PONG	NO	_____	_____	_____	_____
CLEAR PING PONG	NO	_____	_____	_____	_____

Special Notes: _____

_____

_____

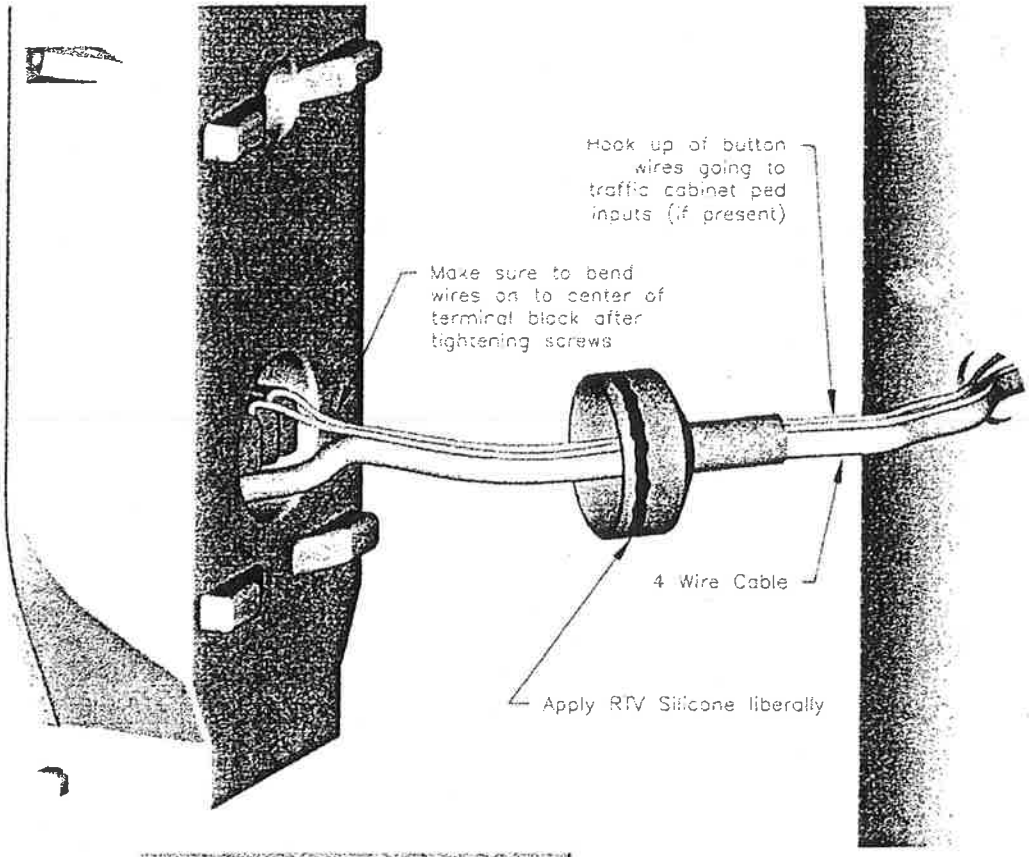
_____

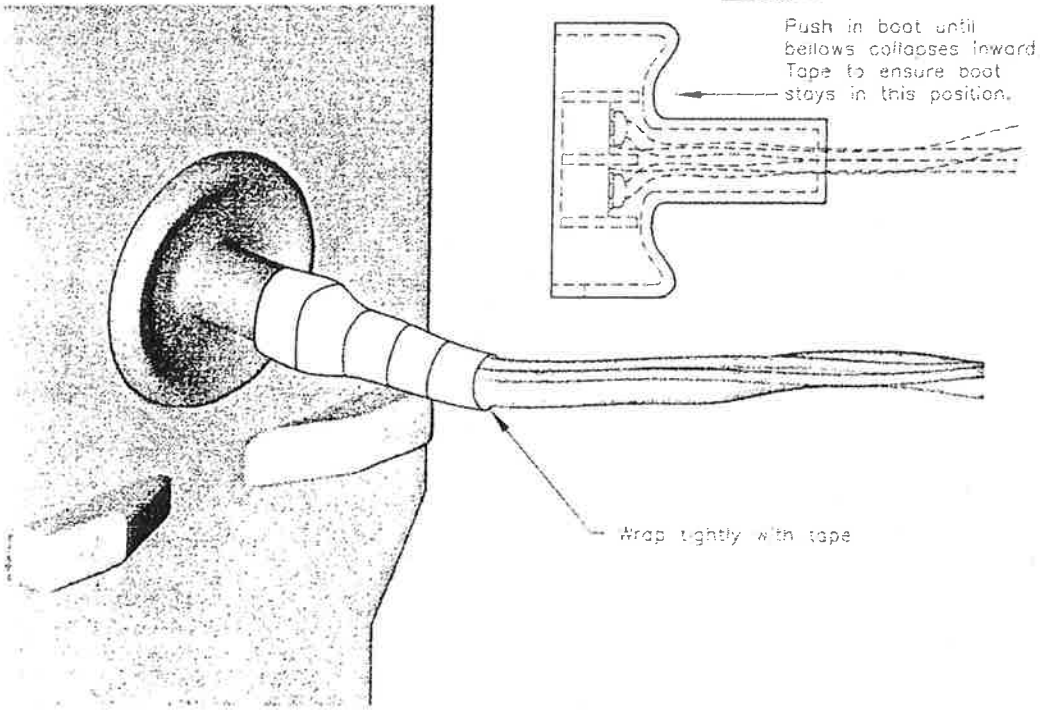
_____

_____

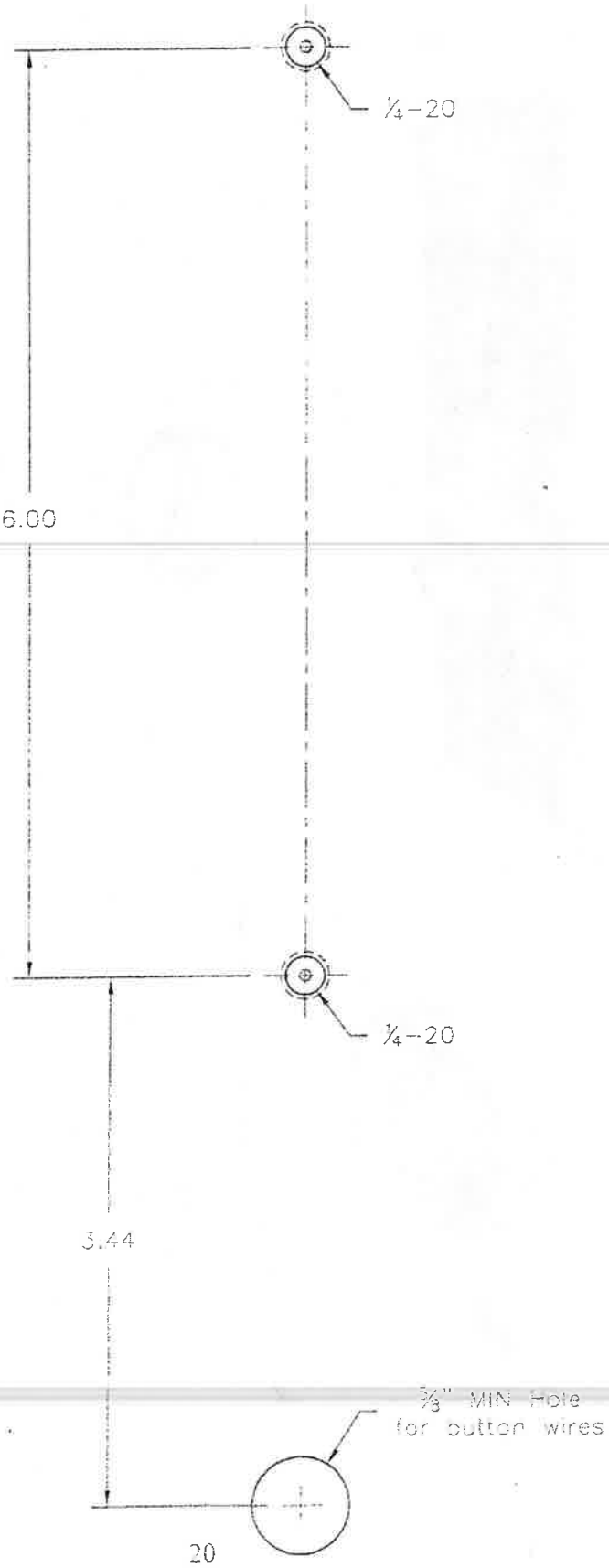
_____

WIRE ROUTING INSTRUCTIONS

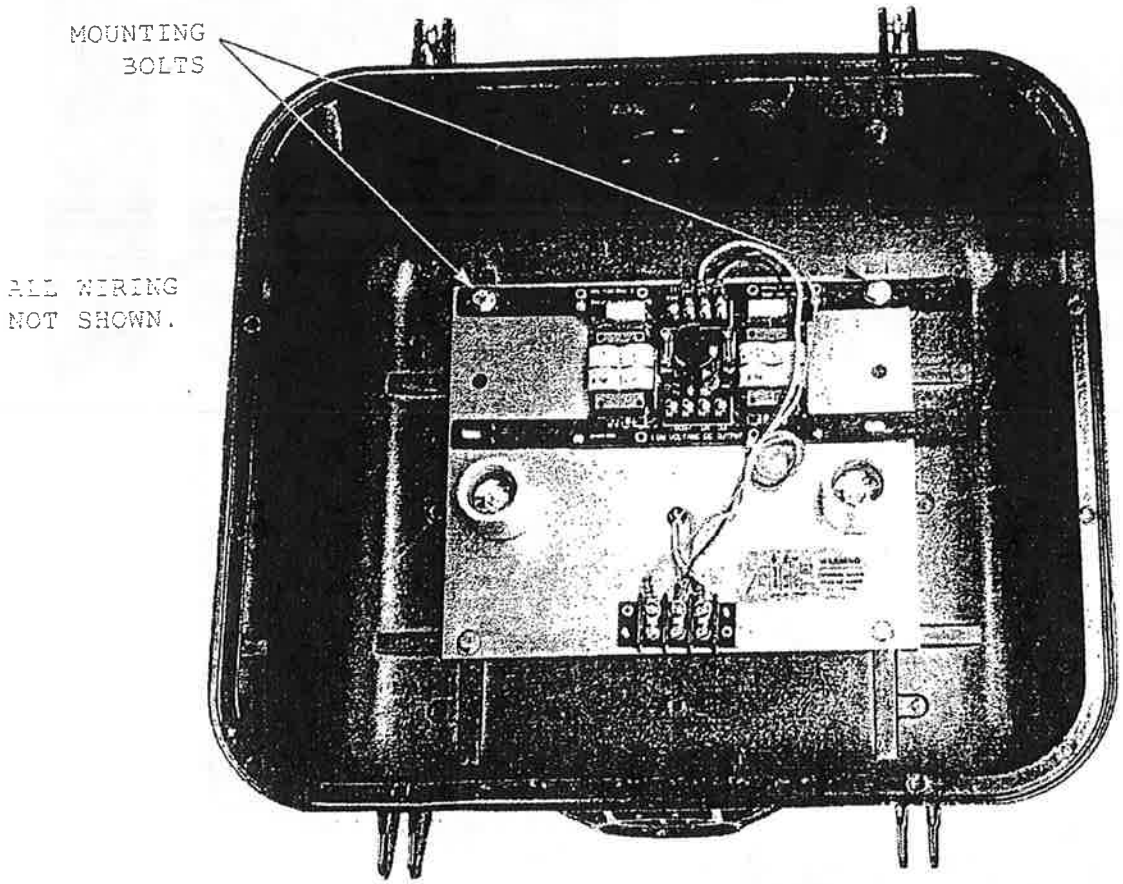


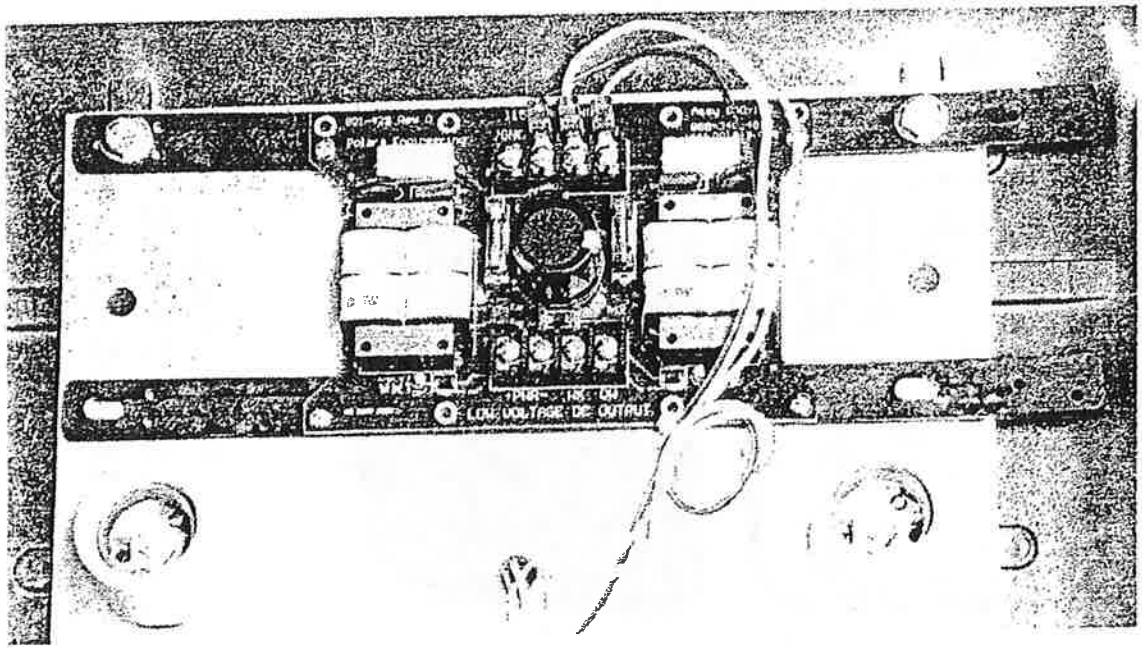


MOUNTING HOLE DIAGRAM

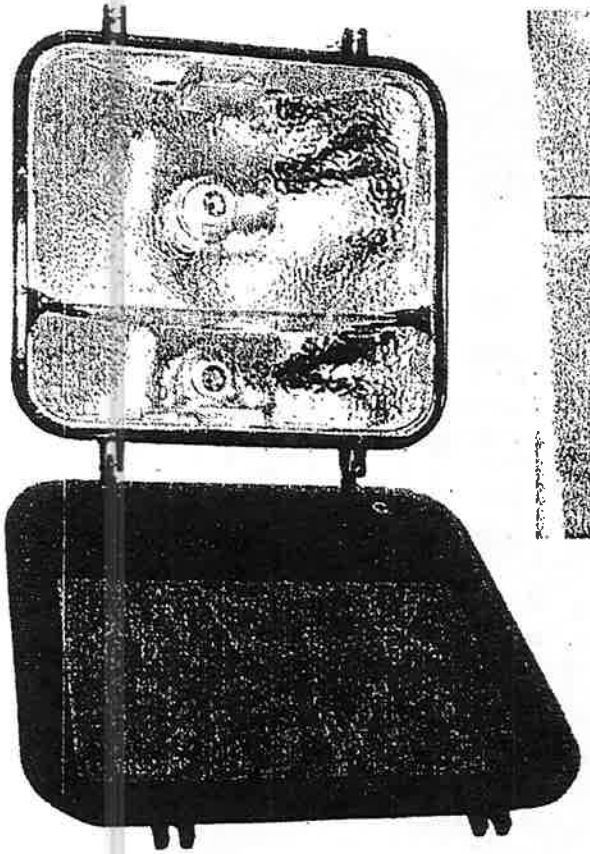


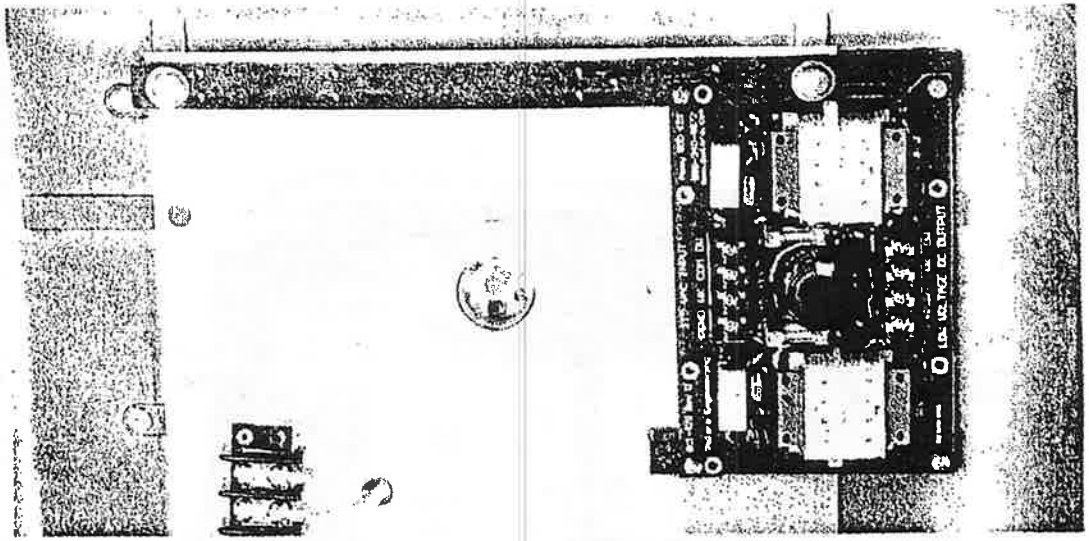
CLAM SHELL HAND/MAN
DUAL INCANDESCENT LAMP

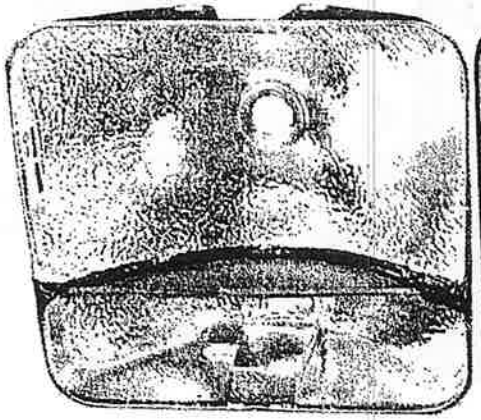


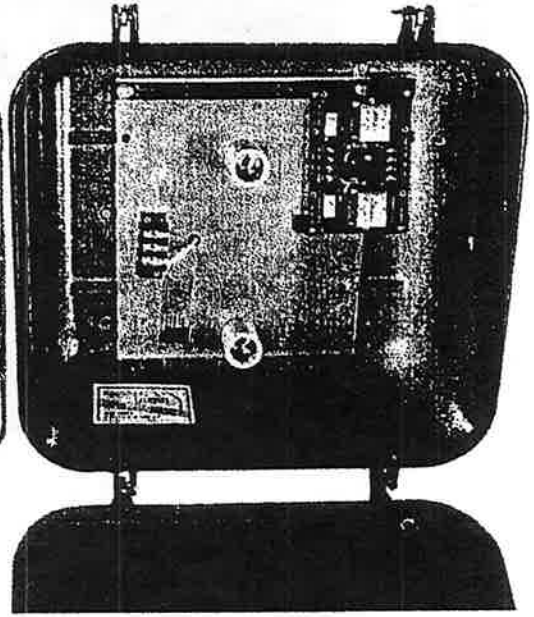


WIRING TO PCB
NOT SHOWN.



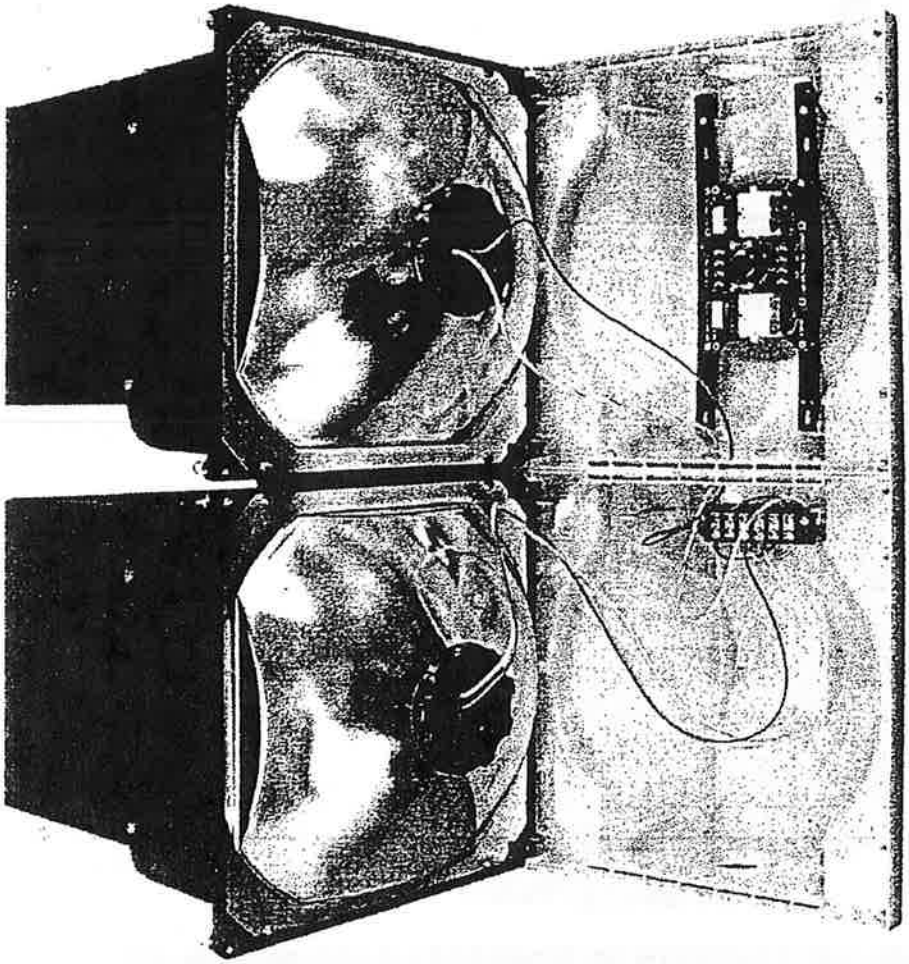






CLAM SHELL
WALK/DON'T WALK WORD
DUAL INCANDESCENT LAMP

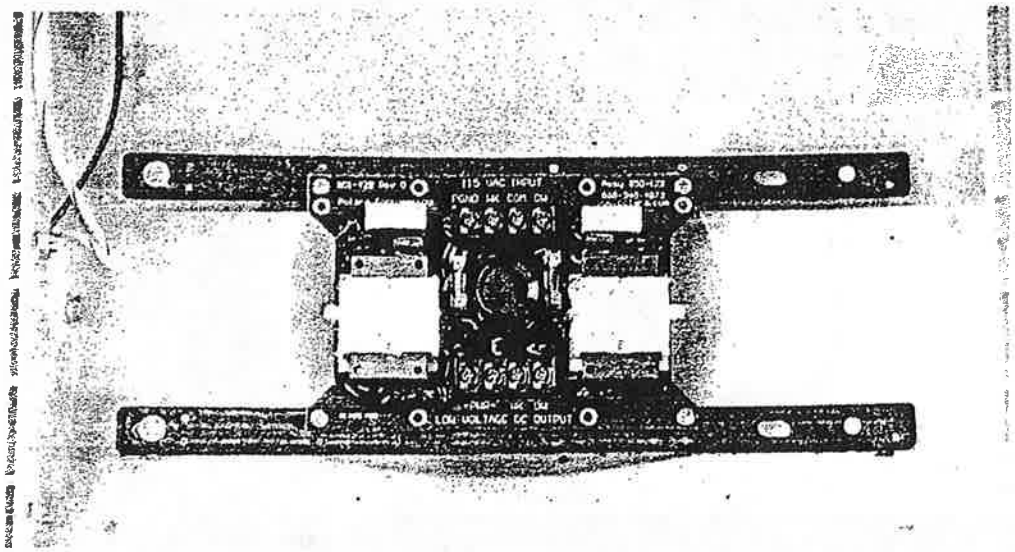
12″ x 12″ OVER/UNDER



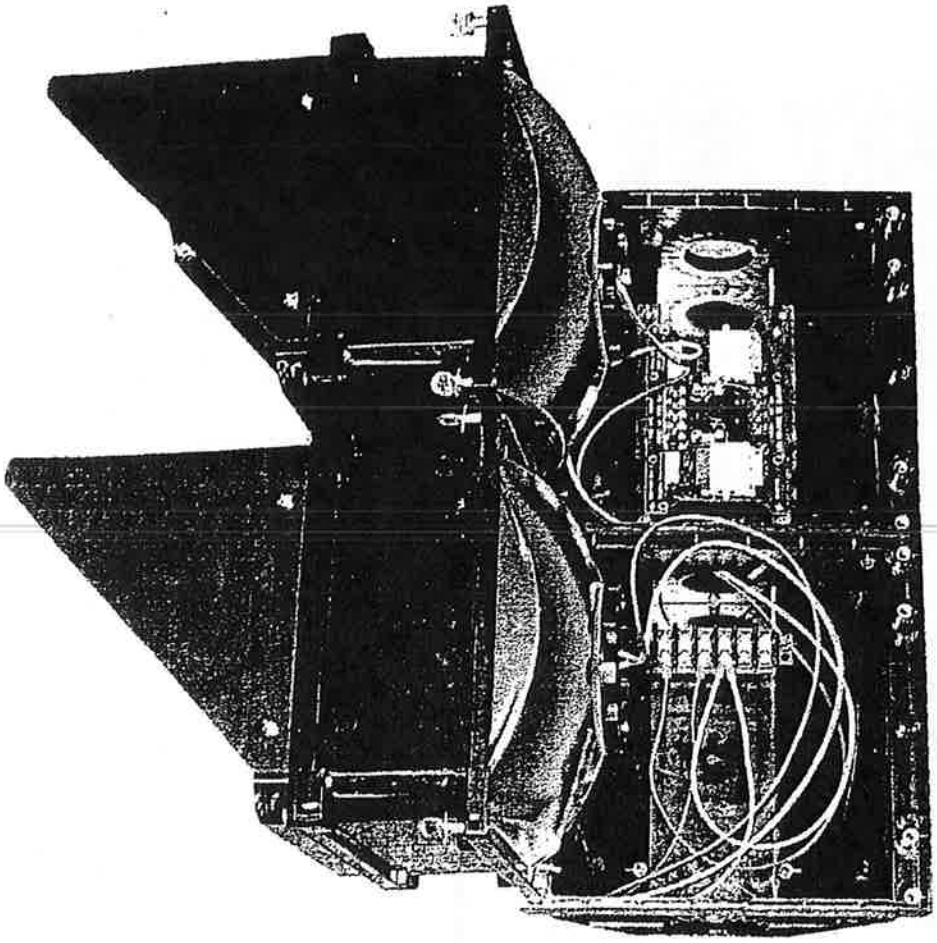
MOUNTED THIS WAY BACK OF LAMP JUST TOUCHES CONTROL UNIT.

IF INTERFERENCE IS TOO GREAT, UNIT CAN BE MOUNTED BACKSIDE OUT (JUST FLIP IT).

WIRING TO PCB NOT SHOWN.

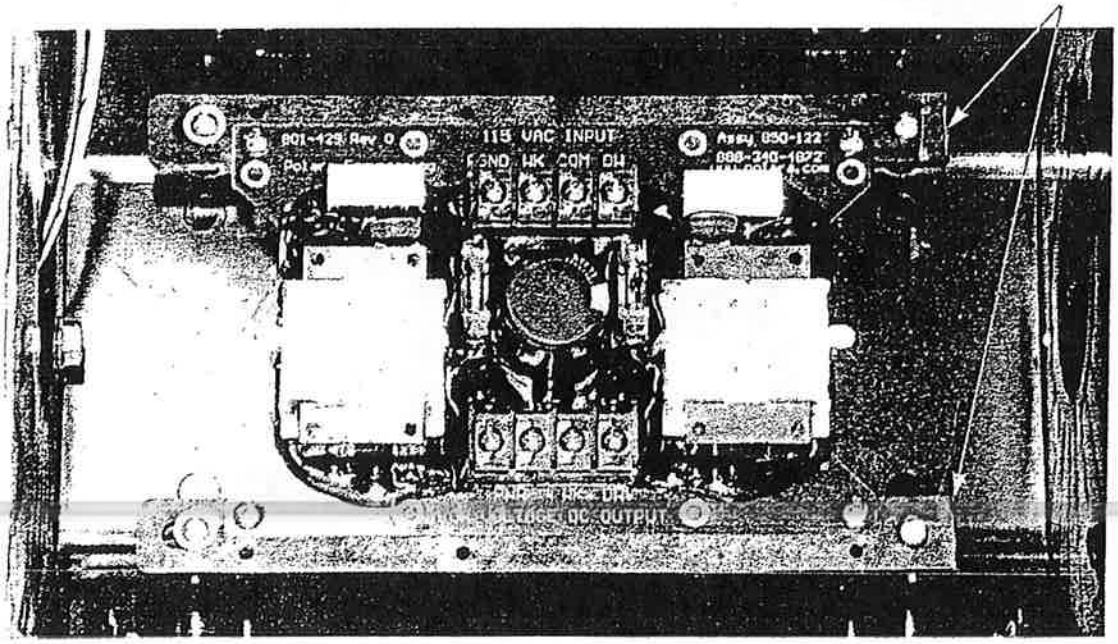


9″ x 9″ OVER/UNDER PED HEAD



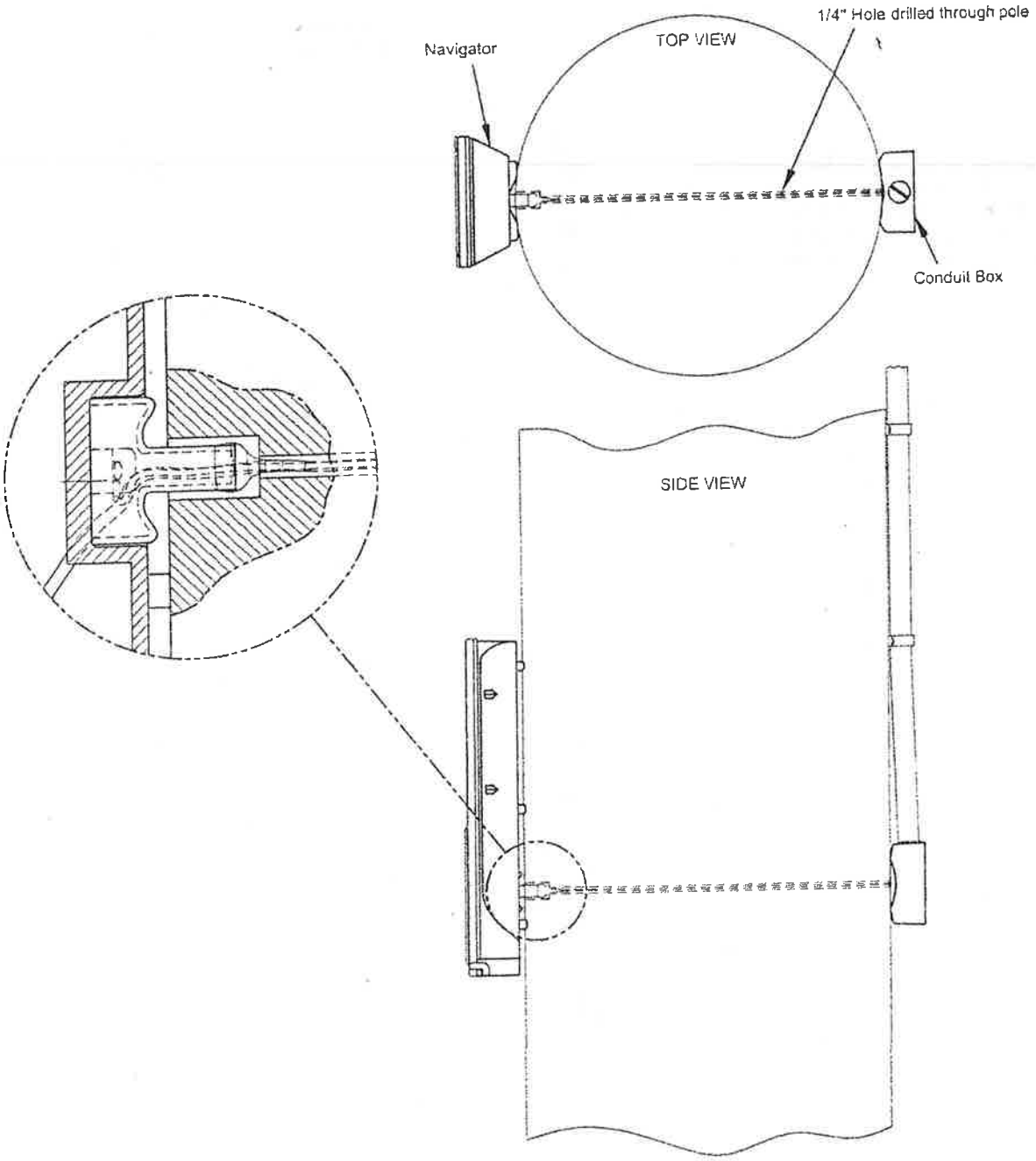
WIRING TO PCB
NOT SHOWN.

CUT BRACKETS AT SNAP
LINE. PCB MOUNTS
TO INSIDE HOLES ON
BRACKETS.



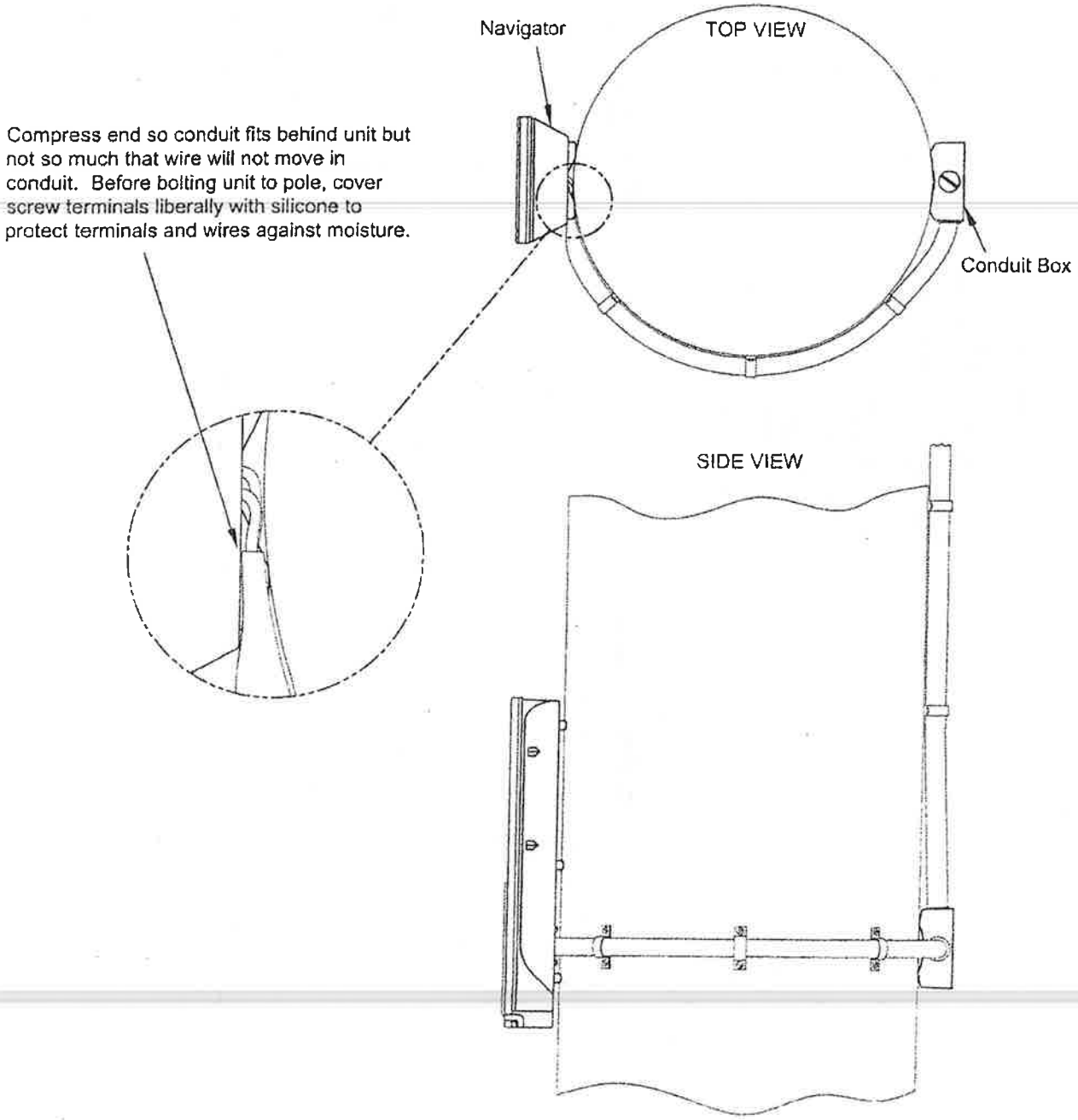
Wood Pole Mounting Option 1

Mount conduit and conduit box on opposite side of pole from Navigator. Drill a ¼" hole through the pole to run wires to Navigator. Mount Navigator as normal.



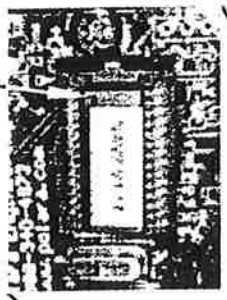
Wood Pole Mounting Option 2

Mount Conduit and Conduit Box on opposite side of pole from Navigator. Mount hard piece of conduit around pole adjacent to Navigator screw terminals. Flatten end so it will fit behind navigator but still allow wire movement. Securely fasten conduit to pole. Mount navigator as normal.



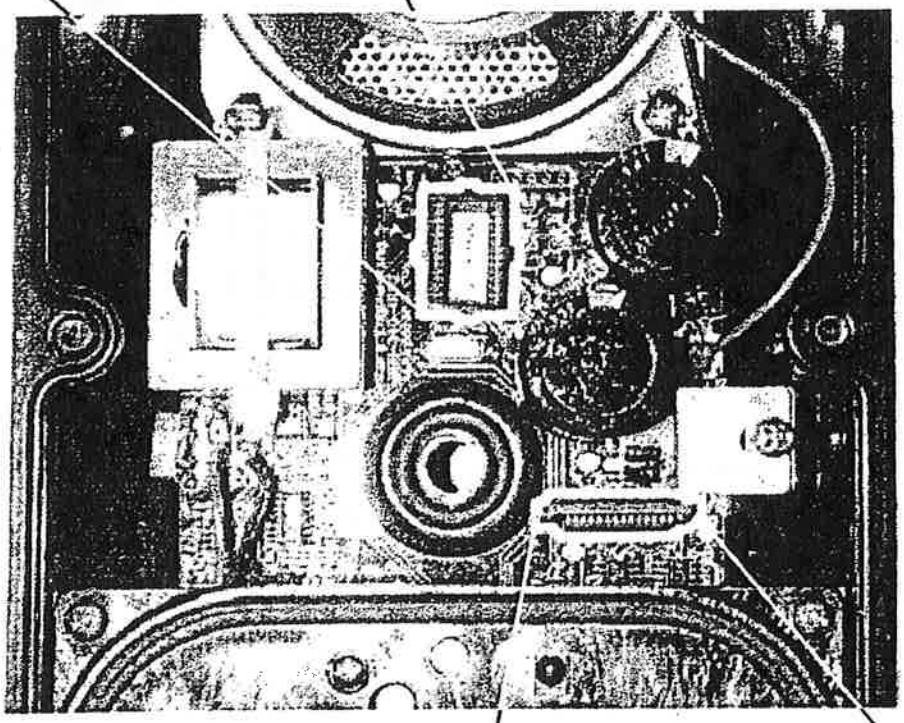
Changing Control Chip and Voice Chip in the Field

Polarity Dot

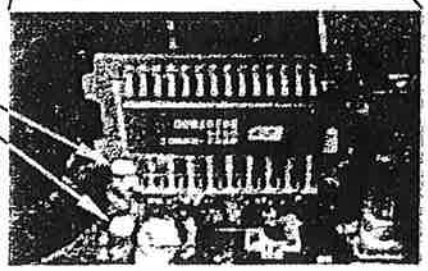


Control Chip:

To remove, pull chip directly out.
To replace, align connector on control chip with header on PCB and make sure polarity dot on chip is towards the top as shown.



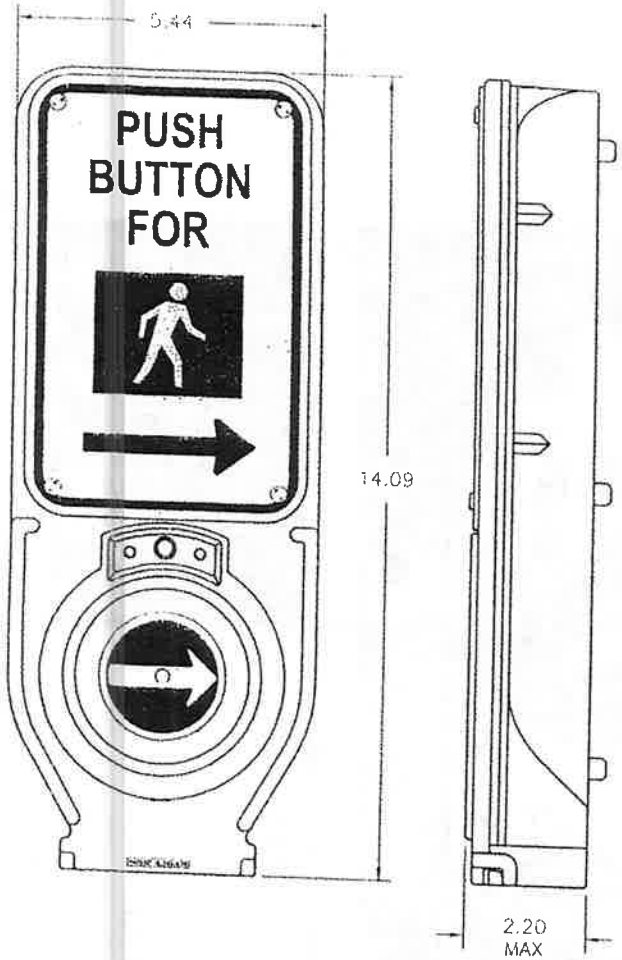
Match polarity dot on Voice Chip with dot on Main PCB (IC should face down).



Voice Chip:

To remove, pull chip directly out.
To replace, align connector on chip with header on PCB making sure the polarity dot on the chip matches with the polarity dot on the Main PCB.

DWG NO
N45AN0-X



PUSH BUTTON STATION

The 4 Wire Navigator PBS is the pedestrian interface to the Navigator Accessible Pedestrian Signal. The PBS provides valuable information and cues via both a vibrating arrow button and audible sounds making the intersection accessible for all pedestrians. All sounds emanate from the back of the unit via a weather-proof speaker that is protected by a vandal resistant screen. A sunlight visible LED latches "ON" to confirm the button has been pushed. Each PBS connects to a Control Unit located inside its associated ped sign housing. A four wire cable connects the PBS to the power unit.

PBS includes:

Frame with Option "A" sign, ADA compliant push button, and mounting hardware.

By interfacing with the Control Unit that installs in the Pedestrian Walk Sign, the PBS can provide the following standard features.

- Confirmation of button push via latching LED, sound, and vibrotactile bounce.
- Direction of travel (with extended button push).
- Standard locating tone during Don't Walk (and clearance if desired).
- Cuckoo, chirp, or standard voice message during walk.
- Vibrating button during walk.
- Standard locating tone, custom sound, or verbal countdown during PED clearance.
- All sounds automatically adjust to ambient over 60dB range.
- Most sounds can have minimum and maximum volume independently set.
- Extended button push can turn on and/or boost volumes during the next walk cycle.

Additional custom options listed on page 2.

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Revised - 06/09/05

REV	DATE	LTR	E.C.O. NO.	BY	CKR	ENG	DSN	MFG	QA	FNL

POLARA ENGINEERING INC.
4115 W. ARTESIA AVE. FULLERTON, CA. 92833

TOLERANCES: .XXX ±.005 XX ±.02 (EXCEPT AS NOTED)

SCALE 1:3				
DRAWN BY BB	CKR.	ENG. MGR.	MFG. MGR.	SHEET 1 OF 2
DATE 09-08-03	DSN. ENG.	Q.A. APP.	FINAL APP.	USE 4W NAV

TITLE
4 WIRE NAVIGATOR
PUSH BUTTON STATION (PBS)

DWG. NO.
N45AN0-X

DWG. NO.
N45AN0-X

Custom message and sound options definable by customer include:

- Custom locating tone
- Informational message
- Custom walk sounds/message
- Custom clearance sound
- Multiple languages (up to three, selectable by user)
- Street name in Braille on the sign

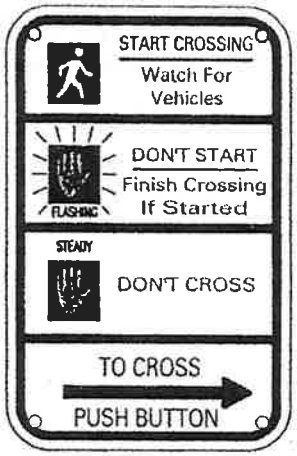
All above features along with many more are field selectable using a Configurator.

Available in three standard colors – Black, Green & Yellow
–X at end of part number specifies color:
–B = Black, –G = Green, –Y = Yellow

Environmental: -40°F to 150°F
Push Button: ADA Compliant, raised tactile arrow on button, solid state switch rated to 20 million actuations minimum.
Construction: Cast aluminum, chem filmed, powder coated

PLATE MARKING OPTIONS

STANDARD OPTION A



OPTION B

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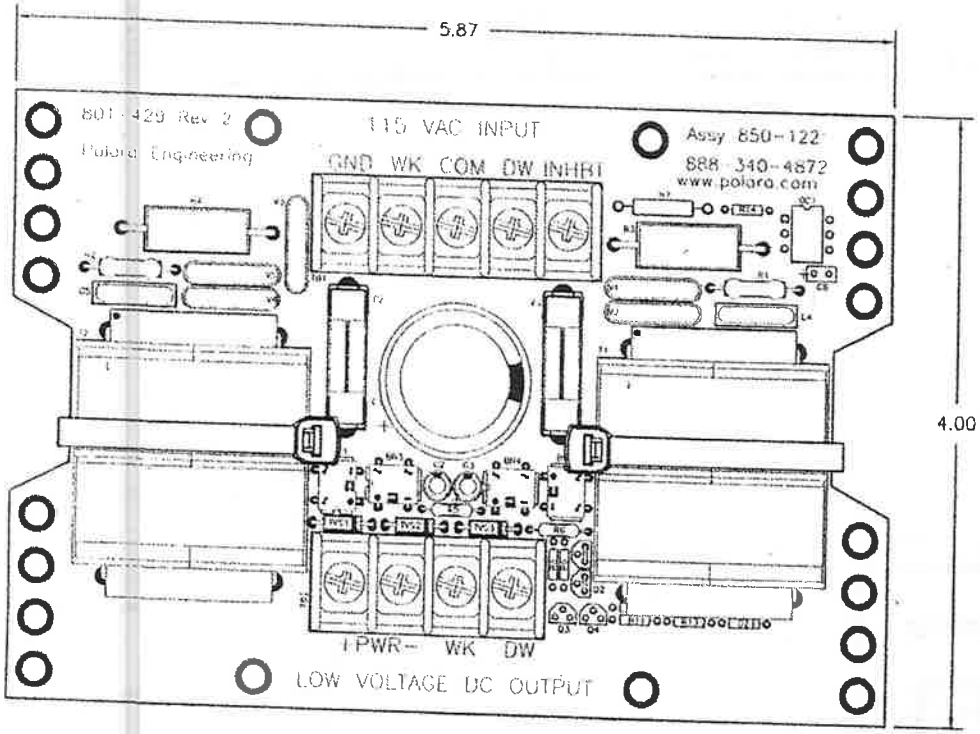
REV	REV. DATE 06-09-05	TOLERANCES: .XXX ±.005 .XX ±.02 (EXCEPT AS NOTED)			TITLE 4 WIRE NAVIGATOR PUSH BUTTON STATION (PBS)	DWG. NO N45AN0-X
ECO	DATE CREATED 09-08-03	SCALE 1:3	SHEET 2 OF 2	USE 4W NAV		

DWG. NO.
PHCU4W



SPECIFICATIONS

INPUT CONNECTIONS: 115VAC, Walk, Don't Walk, Common, Protective Ground, from wiring inside a pedestrian sign (Ped Head).

OUTPUT CONNECTIONS: Approximately 20 Volts DC, Positive and Negative Power, Walk and Don't Walk, to a 4 Wire Push Button Station. The PCHU4W is provided with 2 mounting brackets and hardware which allow easy mounting inside all common types of pedestrian signs. It uses two ¼ amp 5x20mm fuses. It has built in surge protection and is epoxy coated for moisture protection. There are no settings or adjustments.

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Revised – 06/09/05

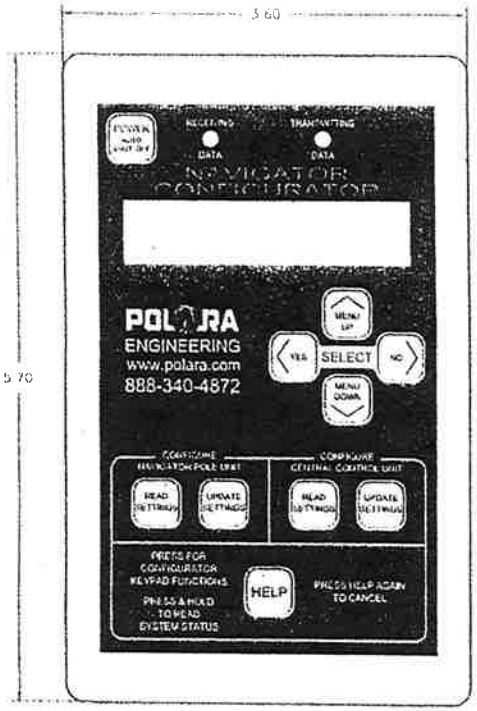
REV. DATE	LTR	E.C.O. NO.	BY	CKR	ENG	DSN	MFG	QA	FNL

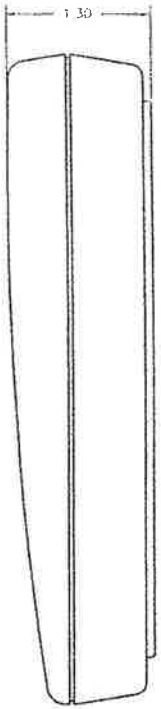
POLARA ENGINEERING INC.
4115 W. ARTESIA AVE. FULLERTON, CA. 92833

TOLERANCES: .XXX ±.005 .XX ±.02 (EXCEPT AS NOTED)

SCALE NONE				
DRAWN BY BB	CKR.	ENG. MGR.	MFG. MGR.	SHEET 1 OF 1
DATE 09-08-03	DSN. ENG.	Q.A. APP.	FINAL APP.	USE 4W NAV
TITLE 4 WIRE POWER UNIT				DWG. NO. PHCU4W

DWG NO
CONFIGURATOR





CONFIGURATOR

The Navigator Configurator is a hand held remote used for configuring a Navigator 2 Wire System or individual 4 Wire Navigator Push Button Stations (PBS). Just stand a few feet in front of a PBS, point the Configurator at the PBS, turn it on and select your options. The Configurator communicates via infrared with the PBS (and CCU of 2 Wire system). One Configurator is all you need for maintaining multiple intersections. All of the configuration options in the CCU and the PBS are set with the Configurator. The beauty of the Navigator system is its interactive operation. For example, if you select one of the optional Locate Sounds, you hear your choice as you select it. When adjusting volume levels, you hear the level you select. After configuring the features you want, you can upload your choices to just that PBS or to all of the PBS's on the entire intersection with a single button push. (Access is password protected to prevent unauthorized changes.)

Display: 2 Line x 16 Character
LCD with backlight, adjustable contrast

Power: 4 X AA 1.5V Cell, Low battery warning
auto or manual shut-off

Operating Temp: 0°C – 50°C

See the operation and instruction manual for 2 Wire and 4 Wire Products for more details.

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Revised – 01/06/04

REV. DATE	LTR	E.C.O. NO.	BY	CKR	ENG	DSN	MFG	QA	FNL

POLARA ENGINEERING INC.
4115 W. ARTESIA AVE. FULLERTON, CA. 92833

TOLERANCES: XXX ±.005 XX ±.02 (EXCEPT AS NOTED)

DRAWN BY	CKR	ENG. MGR	MFG. MGR	SCALE 1:1.5
BB				SHEET 1 OF 1
DATE 03-14-03	DSN. ENG	Q.A. APP.	FINAL APP.	USE NAVCTR

TITLE: NAVIGATOR CONFIGURATOR

DWG NO: CONFIGURATOR

TRAFFIC SIGNAL SYSTEM ACISA LIST

(31 PAGES)

15TH ST Q ST, NW	1043	215	895-B
15TH ST AND R ST, NW	1044	216	1021-D
15TH ST AND RHODE ISLAND AVE, NW	1045	217	537-B
15TH ST AND S ST, NW	1046	218	1022-B
15TH ST AND T ST, NW	1047	219	1023-B
15TH ST AND U ST, NW	1048	220	1024-B
16TH ST AND CONSTITUTION AVE, NW	1049	221	531-D
16TH ST AND H ST, NW	1050	222	619-E
16TH ST AND I ST, NW	1051	223	126-J
16TH ST AND K ST, NW	1052	224	39-L
16TH ST AND L ST, NW	1053	225	904-D
16TH ST AND M ST, NW	1054	226	552-G
16TH ST AND P ST, NW	1055	227	905-C
16TH ST AND Q ST, NW	1056	228	40-C
16TH ST AND R ST, NW	1057	229	127-D
16TH ST AND S ST, NW	1058	230	906-A
16TH ST AND SCOTT CIRCLE, NW	1059	231	81-G
16TH ST AND T ST, NW	1060	232	907-B
16TH ST AND U ST, NW	1061	233	87-E
17TH ST AND EOB DR, NW	1062	234	661-B
17TH ST AND CONNECTICUT AVE AND K ST, NW	1063	235	555-N
17TH ST AND CONNECTICUT AVE AND I ST, NW	1064	236	698-F
17TH AND CONSTITUTION AVE,NW	1065	237	18-J
17TH ST AND DESALES ST, NW	1066	238	1270
17TH ST AND E ST, NW	1067	239	73-H
17TH ST AND F ST, NW	1068	240	96-C
17TH ST AND H ST, NW	1069	241	618-K
17TH ST AND I ST, NW	1070	242	609-I
17TH ST AND N OF INDEPENDENCE AVE, NW	1071	243	1507-A
17TH ST AND K ST, NW (EAST)	1072	244	359-E
17TH ST AND L ST, NW	1073	245	741-D
17TH ST AND M ST, NW	1074	246	738-E
17TH ST AND MASS AVE, NW	1075	247	723-E
17TH ST, NEW HAMSHIRE AVE, SWANN ST, NW	1076	248	304-C
17TH ST AND NEW YORK AVE, STATE PL, NW	1077	249	576-E
17TH ST AND P ST, NW	1078	250	900-B
17TH ST AND PENNSYLVANIA AVE, NW	1079	251	585-E
17TH ST AND Q ST, NW	1080	252	901-B
17TH ST AND R ST, NW	1081	253	902-C
17TH ST AND RHODE ISLAND AVE, NW	1082	254	534-C
17TH ST AND U ST, NW	1083	255	903-B
18TH ST AND CONN AVE, JEFFERSON PL, NW	1084	256	202-K
18TH ST AND CONSTITUTION AVE, NW	1085	257	19-L
18TH ST AND E ST, NW (SOUTH)	1086	258	659-A
18TH ST AND E ST, NEW YORK AVE,NW(NORTH)	1087	259	660-A
18TH ST AND F ST, NW	1088	260	951-B
18TH ST AND G ST, NW	1089	261	1001-A

18TH ST AND H ST, NW	1090	262	617-D
18TH ST AND I ST, NW	1091	263	622-C
18TH ST AND K ST, NW	1092	264	1002-B
18TH ST AND L ST, NW	1093	265	914-F
18TH ST AND M ST, CONN AVE, R I AVE, NW	1094	266	109-K
18TH ST AND MASS AVE, NW	1095	267	760-D
18TH ST AND N ST AND CONN AVE, NW	1096	268	203-Q
18TH ST AND P ST, NW	1097	269	971-B
18TH ST AND PENN AVE, NW	1098	270	36-I
18TH ST AND NEW HAMPSHIRE AVE, NW	1099	271	125.2A
18TH ST AND R ST, NW	1100	272	1003-D
18TH ST AND U ST,VERNON ST, FLA AVE, NW	1101	273	59-H
18TH ST AND VIRGINIA AVE, NW	1102	274	106-C
19TH ST AND C ST AND VIRGINIA AVE, NW	1103	275	60-K
19TH ST AND CONSTITUTION AVE, NW	1104	276	559-H
19TH ST AND E ST(SOUTH), NW	1105	277	627-A
19TH ST AND E ST(NORTH), NW	1106	278	626-B
19TH ST AND F ST, NW	1107	279	1319-A
19TH ST AND FLORIDA AVE AND T ST, NW	1108	280	1378-A
19TH ST AND G ST, NW	1109	281	631-B
19TH ST AND I ST, NW	1110	282	614-E
19TH ST AND K ST, NW	1111	283	547-B
19TH ST AND L ST, NW	1112	284	915-D
19TH ST AND M ST, NW	1113	285	517-G
19TH ST AND PENN AVE AND H ST, NW	1114	286	315-I
19TH ST AND R ST, NW	1115	287	1387
20TH ST AND CONN AVE AND R ST, NW	1116	288	TS-129-G
20TH ST AND CONSTITUTUON AVE, NW	1117	289	566-D
20TH ST AND E ST (SOUTH), NW	1118	290	625-D
20TH ST AND E ST (NORTH), NW	1119	291	624-B
20TH ST AND F ST, NW	1120	292	1261-A
20TH ST AND G ST, NW	1121	293	952-B
20TH ST AND I ST, NW	1122	294	755-G
20TH ST AND K ST, NW	1123	295	1014-C
20TH ST AND L ST, NW	1124	296	916-E
20TH ST AND M ST, NW	1125	297	657-F
20TH ST AND MASS AVE, NW	1126	298	184-D
20TH ST AND N HAMPSHIRE AVE, NW	1127	299	229-G
20TH ST AND P ST, NW	1128	300	584
20TH ST AND PENN AVE, NW	1129	301	1015-E
20TH ST AND Q ST AND CONNECTICUT AVE, NW	1130	302	128-K
20TH ST AND VIRGINIA AVE, NW	1131	303	509-E
21ST ST AND C ST, NW	1132	304	1124
21ST ST AND CONSTITUTION AVE, NW	1133	305	529-E
21ST ST AND E ST, NW (NORTH)	1134	306	653-B
21ST ST AND G ST, NW	1135	307	664
21ST ST AND H ST, NW	1136	308	1318

21ST ST AND I ST AND PENN AVE, NW	1137	309	1037-G
21ST ST AND K ST, NW	1138	310	516-B
21ST ST AND L ST, NW	1139	311	917-C
21ST ST AND M ST, NW	1140	312	85-E
21ST ST AND MASS AVE, NW	1141	313	645-A
21ST ST AND NEW HAMPSHIRE AVE, NW	1142	314	1017
21ST ST AND P ST, NW	1143	315	847
21ST ST AND S ST, CONN AVE, FLA AVE, NW	1144	316	122-W
21ST ST AND VIRGINIA AVE, NW	1145	317	654-B
22ND ST AND CONSTITUTION AVE, NW	1146	318	768-B
22ND ST AND G ST, NW	1147	319	1244
22ND ST,K ST AND 22ND ST,PENN AVE, NW	1148	320	110-H
22ND ST AND L ST AND NEW HAMP.AVE, NW	1149	321	557-L
22ND ST AND M ST, NW	1150	322	1013-D
22ND ST AND N ST, NW	1151	323	1425
22ND ST AND P ST, NW	1152	324	846-C
22ND ST,Q ST AND MASS AVE,FLA AVE, NW	1153	325	135-F
23RD ST AND C ST, NW	1154	326	946-A
23RD ST, CONST AVE AND T R BR RAMPS, NW	1155	327	528-J
23RD ST, E ST, DRIVEWAY TO NAVY HOSP, NW	1156	328	287-L-TEMP
23RD ST AND G ST, NW	1157	329	940-B
23RD ST AND H ST, NW	1158	330	1238
23RD ST AND I ST, NW	1159	331	560-D
23RD ST AND L ST, NW	1160	332	747-D
23RD ST AND M ST(FIREHOUSE),NW	1161	333	523-F
23RD ST AND N ST, NW	1162	334	1426
23RD ST AND P ST, NW	1163	335	380-E
23RD ST AND Q ST AND WATERSIDE DR, NW	1164	336	675-B
23RD ST AND VIRGINIA AVE AND F ST, NW	1165	337	1189-D
24TH ST AND K ST AND PENN AVE, NW	1166	338	166-J
24TH ST AND L ST, NW	1167	339	1355
24TH ST AND M ST, NW	1168	340	947-D
25TH ST AND K ST, NW	1169	341	515-V
25TH ST AND L ST AND PENN AVE, NW	1170	342	525-K
25TH ST AND M ST, NW	1171	343	1220-D
26TH ST AND M ST, NW	1172	344	1485-A
26TH ST AND PENNSYLVANIA AVE, NW	1173	345	1162-I
27TH ST AND I ST AND VIRGINIA AVE, NW	1174	346	285-Q
CONN AVE AND CALIFORNIA ST, NW	1175	348	239-G
CONN AVE AND DESALES ST, NW	1176	349	853-D
CONN AVE AND H ST AND JACKSON PL, NW	1177	350	103-F
CONN AVE AND L ST, NW	1178	351	543-H
CONN AVE AND T ST, NW	1179	352	591-D
CONSTITUTION AVE AND HENRY BACON DR, NW	1180	353	530-G
CONNECTICUT AVE AND KALORAMA RD, NW	1181	502	783-A
EAST EXECUTIVE AVE AND E ST, NW	1182	356	TS-389-P
FLORIDA AVE AND R ST, NW	1183	357	854-A

MASS AVE AND Q ST, NW	1184	359	1018-A
NEW HAMPSHIRE AVE AND M ST, NW	1185	360	230-J
NEW HAMPSHIRE AVE AND R ST, NW	1186	361	977-A
NEW HAMPSHIRE AVE AND VIRGINIA AVE, NW	1187	362	422-CC
E. BOUND INDEP.AVE @ DANIEL FRENCH DR,SW	1188	371	1639
PENN AVE, MADISON PL, EAST EXEC AVE, NW	1189	372	119-H
14TH ST BRIDGE COUNT STATION, SW	1190	512	
VERMONT AVE AND H ST AND MADISON PL, NW	1191	375	740-C
VERMONT AVE AND L ST, NW	1192	376	913-A
VIRGINIA AVE AND E ST, NW	1193	379	281-E
ROCK CREEK PKWY AND VIRGINIA AVE, NW	1194	380	1358-C
DUPONT CIRCLE, NW (MASTER OF 2)	1195	381	108-E
WASHINGTON CIRCLE (NE SIDE), NW	1196	383	527-E
WASHINGTON CIRCLE (SW SIDE), NW	1197	384	650-C
6TH ST AND C ST, SW	1198	431	1266-B
6TH ST AND D ST AND VIRGINIA AVE, SW	1199	432	1417-A
6TH ST AND E ST, SW	1200	433	1409-C
6TH ST AND INDEPENDENCE AVE, SW	1201	435	561-C
6TH ST AND MARYLAND AVE, SW	1202	437	737-A
7TH ST AND ADAMS DR, SW	1203	438	850-D
7TH ST AND C ST AND MARYLAND AVE, SW	1204	439	223-E
7TH ST AND D ST, SW	1205	440	999-D
7TH ST AND FRONTAGE RD, SW	1206	441	1646
7TH ST AND G ST, SW	1207	442	979-C
7TH ST AND INDEPENDENCE AVE, SW	1208	444	100-P
7TH ST AND JEFFERSON DR, SW	1209	445	849-D
7TH ST AND E/B RAMP TO SW FREEWAY, SW	1210	447	1500-D
9TH ST AND D ST, SW	1211	448	1083-I
9TH ST AND INDEPENDENCE AVE, SW	1212	449	767-E
17TH ST. & SOUTH MALL PED. CROSSING,SW	1213	1400	1644
10TH ST AND D ST, SW	1214	451	1082-D
10TH ST AND INDEPENDENCE AVE, SW	1215	452	444-E
12TH ST AND C ST, SW	1216	454	345-I
12TH ST AND D ST, SW	1217	455	1275-C
12TH ST AND EXPRESSWAY AT RAMP G, SW	1218	456	536-F
12TH ST AND INDEPENDENCE AVE, SW	1219	457	169-Q
12TH ST AND MARYLAND AVE, SW	1220	458	1274-E
D ST BETWEEN 13TH ST AND 14TH ST, SW	1221	459	94-A
14TH ST AND C ST, SW	1222	460	486-P
14TH ST AND INDEPENDENCE AVE, SW	1223	461	562-E
14TH ST AND JEFFERSON DR, SW	1224	462	1128-E
EAST BASIN DR AND RAUL WALLENBERG,PL,SW	1225	463	1032-C
15TH ST AND INDEPENDENCE AVE, SW	1226	464	200-I
23RD ST AND INDEPENDENCE AVE, SW	1227	465	99-E
EAST BASIN DR AND MAINE AVE, SW	1228	471	198-F
21ST AND F ST NW	1229	1424	1657
23RD ST AND CONNSTITUTION AVE, NW	1230	514	

7TH ST AND E ST, SW	1231	516	1645
7TH ST AND I ST, SW	1232	443	458-C
18TH ST AND CALIFORNIA ST, NW	1233	1121	1445
18TH ST AND KAL0RAMA RD, NW	1234	1123	1173
FLORIDA AVE AND CALIFORNIA ST, NW	1235	1210	1363
18TH ST AND S ST, NW	1236	121	1520
27TH,K ST, AND WHITEHURST FRWY, NW	1237	1284	606-H
20TH ST AND H ST, NW	1238	1292	1529-A
NEW HAMPSHIRE AVE AND N ST, NW	1239	1300	1539
W.BOUND INDEP. AVE @ DANIEL FRENCH DR,SW	1240	1401	1638-A
ROCK CREEK PKWY & RAMP FROM KENNEDY CTR	1241	1319	1549-C
15TH ST. AND JEFFERSON DR.,SW	1242	1383	1621-A
15TH ST. AND MADISON DR, NW	1243	1386	1620-A
POTOMAC PKWY AND JFK CENTER, SOUTH, NW	1244	1320	
14TH ST BRIDGE RAMP AND MAINE AVE, SW	1245	1350	1557-A
E ST @ ELLIPSE EAST BOUND, NW	1246	1351	1580-A
E ST @ ELLIPSE WEST BOUND, NW	1247	1352	1580-2
W.BOUND INDEP.AVE & W.BOUND MAINE AVE,SW	1248	1403	1643-A
RAOUL WALLENBERG AND HOLOCAUST MUSEUM	1249	1385	1622
E.BOUND INDEP.AVE & E.BOUND TIDAL BASIN	1250	1404	1641
F ST PED XING E OF 14TH ST,NW	1251	1376	1596-A
K STREET,NW. PED. CROSSING AT 26TH ST.	1252	1391	1634-A
INDEPENDENCE AVE AND WEST BASIN DRIVE,SW	1253	1378	1597
20TH ST AND N ST, NW	1254	1416	1656
17TH ST S.BOUND & W.BOUND INDEP. AVE, SW	1255	1399	1642
18TH STREET AND C STREET, NW	1256	1458	1696
E.BOUND INDEP. AVE@ DANIEL FRENCH DR, SW	1258	1402	6207
22ND STREET AND F STREET, NW	1360	1459	1245-A
23RD STAND LINCOLN CIRCLE,EAST, NW	1361	1466	1692
HENRY BACON DRIVE AND LINCOLN CIRCLE, NW	1362	1467	1693
THOMAS CIRCLE WEST SIDE	1365	1480	69F.2-B
THOMAS CIRCLE NORTH SIDE	1366	1479	69F.2-A
THOMAS CIRCLE EAST SIDE	1367	1481	69F.1-B
1ST ST AND C ST. AND INDIANA AVE, NW	2001	1	317-F
1ST ST AND CONSTITUTION AVE, NW	2002	9902	697-E
1ST ST AND CONSTITUTION AVE NW	2002	2	697-E
1ST ST AND D ST, NW	2003	3	1104-B
1ST ST AND E ST, NW	2004	4	791-A
1ST ST AND F ST NW	2005	5	441-C
1ST ST AND H ST, NW	2006	6	807-C
1ST ST AND K ST, NW	2007	7	808-C
1ST ST AND LOUISIANA AVE, NW	2008	8	874-B
1ST ST, MASS AVE,NEW JERSEY AVE,G ST, NW	2009	10	157-K
1ST TERRACE AND K ST, NW	2010	17	1430-A
2ND ST AND D ST AND RAMP J, NW	2011	18	1377-A
2ND ST AND E ST, NW	2012	19	488-G
2ND ST AND H ST, NW	2013	20	1376-D

2ND ST AND MASSACHUSETTS AVE, NW	2014	21	1260-E
3RD ST AND C ST AND GARAGE ENTRANCE, NW	2015	23	350-G
3RD ST AND CONSTITUTION AVE, NW	2016	24	179.1-H
3RD ST AND E ST, NW	2018	26	987-B
3RD ST AND G ST, NW	2019	27	810-F
3RD ST AND H ST AND MASS AVE, NW	2020	28	34-Q
1ST ST AND F ST AND NEW JERSEY AVE, NW	2021	1456	1724
3RD ST AND MADISON DR, NW	2022	31	1442-A
3RD ST AND PENN AVE, NW	2023	32	179.2-J
3RD ST AND WASHINGTON DR, NW	2024	34	1438-C
4TH ST AND E ST, NW	2025	35	535-A
4TH ST AND G ST, NW	2026	36	1141-C
4TH ST AND H ST AND MASS AVE, NW	2027	37	35-S
4TH ST AND K ST, NW	2028	38	92-C
4TH ST AND MADISON DR, NW	2029	39	1440-D
4TH ST AND PENN AVE, NW	2030	42	1527
4TH ST AND WASHINGTON DR, NW	2031	45	295-D
5TH ST AND E ST, NW	2032	46	812-A
5TH ST AND G ST, NW	2033	48	813-A
5TH ST AND H ST, NW	2034	49	814-A
5TH ST AND I ST AND MASS AVE, NW	2035	50	159-C
5TH ST AND K ST, NW	2036	51	817-A
9TH ST AND CONSTITUTION AVE, NW	2037	96	501-G
6TH ST AND C ST, NW	2038	53	492-F
6TH ST AND CONSTITUTION AVE, NW	2039	54	177.2B
6TH ST AND D ST AND INDIANA AVE, NW	2040	55	278-J
6TH ST AND E ST, NW	2041	56	288-I
6TH ST AND F ST, NW	2042	57	1116-E
6TH ST AND G ST, NW	2043	58	1117-G
6TH ST AND H ST, NW	2044	59	570-F
6TH ST AND I ST, NW	2045	60	929-E
6TH ST AND K ST, NW	2046	61	1118-F
6TH ST AND NEW YORK AVE, NW	2047	62	1633-A
0	2048	63	981-D
6TH ST AND MASS AVE, NW	2049	64	1119-H
6TH ST AND N ST, NW	2050	65	982-D
6TH ST AND PENN AVE, NW	2051	68	177.1C
7TH ST AND CONSTITUTION AVE, NW	2052	73	818-E
7TH ST AND D ST, NW	2053	74	347-A
7TH ST AND E ST, NW	2054	75	351-F
7TH ST AND F ST, NW	2055	76	352-F
7TH ST AND FLORIDA AND GEORGIA AVE, NW	2056	77	839-H
7TH ST AND G ST, NW	2057	78	346-E
7TH ST AND H ST, NW	2058	79	819-C
7TH ST AND I ST, NW	2059	80	930-B
7TH ST AND INDIANA AVE, NW	2060	81	558-F
7TH ST AND K ST AND MASS AVE, NW	2061	82	992-A

7TH ST AND L ST, NW	2062	83	374-J
7TH ST AND M ST, NW	2063	84	993-D
7TH ST AND N ST, NW	2064	86	994-E
7TH ST AND NEW YORK AVE, NW	2065	87	472-I
7TH ST AND PENN AVE, NW	2066	90	86-J.1
8TH ST AND E ST, NW	2067	95	820-E
9TH ST AND D ST, NW	2068	97	990-F
9TH ST AND E ST, NW	2069	98	821-B
9TH ST AND F ST, NW	2070	99	487-J
9TH ST AND G ST, NW	2071	100	674-M
9TH ST AND H ST, NW	2072	101	822-D
LOUISIANA AVE AND C ST, NW	2073	503	38.1-A
9TH ST AND K ST AND NEW YORK AVE, NW	2074	103	457-G
9TH ST AND L ST, NW	2075	104	793-F
9TH ST AND M ST, NW	2076	105	823-E
9TH ST AND MASS AVE, NW	2077	106	15-K
9TH ST AND O ST, NW	2078	107	894-A
9TH ST AND P ST, NW	2079	108	824-E
9TH ST AND PENN AVE, NW	2080	109	668-C.1
9TH ST AND Q ST, NW	2081	110	250-H
9TH ST AND R ST, NW	2082	111	825-A
9TH ST AND RHODE ISLAND AVE, NW	2083	112	476-F
9TH ST AND S ST, NW	2084	113	691-B
9TH ST AND U ST AND FLORIDA AVE, NW	2085	114	42-I
10TH ST AND D ST AND PENN AVE, NW	2086	116	260-I
10TH ST AND E ST, NW	2087	117	826-D
10TH ST AND F ST, NW	2088	118	264-G
10TH ST AND G ST, NW	2089	119	262-L
10TH ST AND H ST, NW	2090	120	827-C
NEW JERSEY AVE AND C ST, NW	2091	504	38.3B
10TH ST AND K ST, NW	2092	122	988-C
10TH ST AND L ST, NW	2093	123	663-C
10TH ST AND M ST, NW	2094	124	794-A
10TH ST AND MASS AVE, NW	2095	125	76-D
10TH ST AND NEW YORK AVE, NW	2096	126	693-F
10TH ST AND P ST, NW	2097	127	795-A
10TH ST AND R ST, NW	2098	128	989-A
10TH ST AND RHODE IS.AVE AND Q ST, NW	2099	129	236-F
10TH ST AND S ST, NW	2100	130	1226
10TH ST AND T ST AND VERMONT AVE, NW	2101	131	452-B
11TH ST AND E ST, NW	2102	132	829-B
11TH ST AND F ST, NW	2103	133	248-D
11TH ST AND G ST, NW	2104	134	265-E
11TH ST AND H ST, NW	2105	135	830-B
11TH ST AND I ST AND NEW YORK AVE, NW	2106	136	147-J
11TH ST AND K ST, NW	2107	137	582-B
11TH ST AND M ST, NW	2108	138	833-A

11TH ST AND MASS AVE AND L ST, NW	2109	139	696-C
11TH ST AND P ST, NW	2110	140	1168-A
11TH ST AND PENN AVE, NW	2111	141	23-L
11TH ST AND Q ST, NW	2112	142	496-A
11TH ST AND Q ST ,RHODE ISLAND AVE, NW	2113	143	477-F
11TH ST AND R ST, NW	2114	144	796-A
11TH ST AND U ST, NW	2115	145	519-D
11TH ST AND VERMONT AVE AND S ST, NW	2116	146	65-D
12TH ST AND E ST, NW	2117	149	398-I
12TH ST AND F ST, NW	2118	150	12-K
12TH ST AND G ST, NW	2119	151	266-K
12TH ST AND H ST, NW	2120	152	451-C
12TH ST AND I ST, NW	2121	153	692-B
12TH ST AND K ST, NW	2122	154	891-D
12TH ST AND L ST, NW	2123	155	379-C
12TH ST AND M ST, NW	2124	156	893-B
12TH ST AND MASS AVE, NW	2125	157	892-B
12TH ST AND NEW YORK AVE, NW	2126	158	514-D
12TH ST AND PENN AVE, NW	2127	159	263-J
12TH ST AND Q ST, NW	2128	160	500-A
12TH ST AND RHODE ISLAND AVE, P ST, NW	2129	161	369-B
12TH ST AND VERMONT AVE AND R ST, NW	2130	162	71-E
13TH ST AND LOWER E ST AND PENN AVE, NW	2131	163	22-O
13TH ST AND UPPER E ST, NW	2132	164	79-K
13TH ST AND F ST, NW	2133	165	13-G
13TH ST AND G ST, NW	2134	166	280-F
13TH ST AND H ST AND NEW YORK AVE, NW	2135	167	164-N
13TH ST AND I ST, NW	2136	168	68-J
13TH ST AND K ST, NW	2137	169	306-H
13TH ST AND L ST, NW	2138	170	368-J
13TH ST AND M ST, NW	2139	171	771-B
13TH ST AND MASS AVE, NW	2140	172	735-F
13TH ST AND N ST, NW	2141	173	949-B
13TH ST AND Q ST, NW	2142	174	918-C
13TH ST AND R ST, NW	2143	175	919-D
13TH ST AND S ST, NW	2144	176	799-C
13TH ST AND T ST, NW	2145	177	920-D
13TH ST AND U ST, NW	2146	178	803-E
CONSTITUTION AVE AND NEW JERSEY AVE, NW	2147	354	46-G
LOUISIANA AVE AND CONSTITUTION AVE, NW	2148	358	415-G
NEW JERSEY AVE AND D ST, NW	2149	363	1158-B
NEW JERSEY AVE AND E ST, NW	2150	364	361-F
NEW JERSEY AVE AND G ST, NW	2151	365	1446
NEW JERSEY AVE AND H ST, NW	2152	366	938-B
NEW JERSEY AVE AND K ST, NW	2153	367	1009-F
NEW JERSEY AVE AND LOUISIANA AVE, NW	2154	368	38.2B
VERMONT AVE AND Q ST, NW	2155	377	450-B

VERMONT AVE AND U ST, NW	2156	378	446-F
LOGAN CIRCLE, NW (MASTER OF 2)	2157	382	58L.1
1ST ST AND C ST, NE	2158	385	867-A
1ST ST AND CONSTITUTION AVE, NE	2159	386	30-N
1ST ST AND D ST, NE	2160	387	710-B
1ST ST AND K ST, NE	2161	389	183-A
1ST ST AND M ST, NE	2162	390	726-A
1ST ST AND MARYLAND AVE, NE	2163	391	787-A
1ST ST(EAST) AND MASS AVE, NE	2164	392	1456-B
1ST ST(WEST)AND MASS AVE AND E ST, NE	2165	393	1457-B
DELAWARE AVE AND C ST, NE	2166	396	475-E
DELAWARE AVE AND CONSTITUTION AVE, NE	2167	397	520-F
DELAWARE AVE AND D ST, NE	2168	398	695-B
DELAWARE AVE AND MASS AVE(E/B), NE	2169	399	63.1-A
DELAWARE AVE AND MASS AVE(W/B), NE	2170	400	63.2
HALF ST AND M ST, SW	2171	405	732-A
1ST ST AND WASHINGTON AVE AND C ST, SW	2172	406	162-W
1ST ST AND INDEPENDENCE AVE, SW	2173	407	37-M
1ST ST AND M ST AND CANAL ST, SW	2174	408	357-H
2ND ST AND C ST AND RAMP 5A, SW	2175	409	587-P
2ND ST AND D ST, SW	2176	410	1194-H
2ND ST AND VIRGINIA AVE, SW	2177	411	1332-C
3RD ST AND ADAMS DR, SW	2178	412	1019-E
3RD ST AND C ST, SW	2179	413	565-P
3RD ST AND D ST, SW	2180	414	1193-E
3RD ST AND I ST, SW	2181	415	646-A
3RD ST AND INDEPENDENCE AVE, SW	2182	416	77-I
3RD ST AND JEFFERSON DR, SW	2183	417	1439-D
3RD ST AND M ST, SW	2184	418	595-B
3RD ST AND MARYLAND AVE, SW	2185	419	43-K
4TH ST AND ADAMS DR, SW	2186	420	303-E
4TH ST AND C ST, SW	2187	421	613-B
4TH ST AND E ST, SW	2188	422	629-A
4TH ST AND G ST, SW	2189	423	662-A
4TH ST AND I ST, SW	2190	424	642-C
4TH ST AND INDEPENDENCE AVE, SW	2191	425	74-P
4TH ST AND JEFFERSON DR, SW	2192	426	1441-D
4TH ST AND M ST, SW	2193	427	592-P
4TH ST AND N ST, SW	2194	428	1030-B
4TH ST AND P ST AND FT MCNAIR ENTR, SW	2195	429	575-B
4TH ST AND VIRGINIA AVE, SW	2196	430	1404
6TH ST AND I ST, SW	2197	434	648-B
6TH ST AND MAINE AVE AND M ST, SW	2198	436	721
10TH ST AND CONSTITUTION AVE, NW	2199	115	310-D
7TH ST AND MAINE AVE, SW	2200	446	1143-E
PENN AVE AND CONSTITUTION AVE (EAST), NW	2201	505	1522-A
WASHINGTON AVE AND C ST, SW	2202	466	1339-C

CANAL ST AND D ST AND DELAWARE AVE, SW	2203	467	232-T
WASHINGTON AVE AND INDEPENDENCE AVE SW	2204	468	1320-F
PENN AVE AND CONSTITUTION AVE (WEST), NW	2205	506	1526-B
DELAWARE AVE AND I ST, SW	2206	470	649
1ST ST AND C ST, SE	2207	472	680-A
1ST ST AND INDEPENDENCE AVE, SE	2208	473	115-G
1ST ST AND M ST, SE	2209	474	968-G
2ND ST AND M ST, SE	2210	475	718-A
NEW JERSEY AVE AND C ST, SE	2211	476	739-A
NEW JERSEY AVE AND INDEPENDENCE AVE, SE	2212	477	145-I
N CAPITOL ST AND D ST AND LOUISANA AVE	2213	478	189-I
N CAPITOL ST AND E ST	2214	479	408-B
N CAPITOL ST AND F ST AND MASS AVE	2215	480	24-K
N CAPITOL ST AND G PLACE	2216	482	1342-A
N CAPITOL ST AND H ST	2217	483	513-I
N CAPITOL ST AND I ST	2218	484	511-B
N CAPITOL ST AND K ST	2219	485	512-C
N CAPITOL ST AND L ST	2220	486	356-C
N CAPITOL ST AND M ST	2221	488	532-D
S CAPITOL AND G ST PARK LOT, SW	2222	507	483-D
S CAPITOL ST AND C ST	2223	494	1029-A
S CAPITOL ST AND CANAL ST AND E ST	2224	495	116-J
S CAPITOL ST AND D ST	2225	496	963-A
S CAPITOL ST AND I ST	2226	497	533-L
S CAPITOL ST AND INDEPENDENCE AVE	2227	498	656-E
S CAPITOL ST AND M ST	2228	499	181-Z
S CAPITOL ST AND VA. AVE	2229	500	539-C
EAST CAPITOL ST AND 1ST ST	2230	501	55-J
LOUISIANA AVE AND MASS AVE, NE	2231	511	64-D
S CAPITOL ST AND O ST	2232	515	
9TH ST AND MAINE AVE, SW	2233	450	1163-D
1ST ST AND D ST, SE	2234	508	964-A
NEW JERSEY AND D ST, SE	2235	509	973-A
9TH ST AND EYE ST, NW	2236	102	931-C
H STREET AND UNION STATION,NE	2237	1339	1571-B
9TH ST AND N ST, NW	2238	1296	1309-E
5TH ST, D ST, AND INDIANA AVE, NW	2239	1299	1538-A
10TH ST AND U ST, NW	2240	1316	1556-B
9TH ST AND T ST, NW	2241	1317	1550-B
M STREET AND DELAWARE AVE. S.W.	2242	1418	553-B
3RD ST AND M ST, SE	2243	1332	1551-B
1ST ST AND L ST NE	2245	1338	1567
11TH STREET AND N ST, NW	2246	1362	1453-A
13TH ST AND O ST, NW	2247	1321	1563
6TH STREET AND L STREET,NW	2248	1390	1634-B
M ST, AND ISAAC HULL AVE, SE	2249	453	1517-F
N CAPITOL ST AND G ST	2250	1417	1655

INDEP. AVE, S.DRIVE,@ RAYBURN HOUSE, SW	2251	1429	1699
7TH ST AND T ST, NW	2252	1436	1706
11TH ST AND O ST, NW	2253	1440	1684
H STREET AND RAMP #4 UNION STATION,NE	2254	1450	2073-E
12TH ST AND U ST, NW	2257	1430	1701
SOUTH CAPITOL, WASHINGTON AND CANAL SW	2258	1476	1732
4TH AND M STREET SE	2259	1482	1740
NEW JERSEY AND M STREET SE.	2260	1483	1741
10TH ST BETWEEN E ST AND F ST, NW	2395	1463	1725
BLADENSBURG AND ARBORETUM ENTRANCE, NE	3000	1006	1666
1ST ST AND M ST, NW	3001	9	1044-C
1ST ST AND NEW YORK AVE, NW	3002	11	467-H
1ST ST AND O ST, NW	3003	12	809-A
1ST ST AND P ST, NW	3004	13	1475
1ST ST AND Q ST, NW	3005	14	1070-A
1ST ST AND FLORIDA AVE, NW	3006	15	962-B
1ST ST AND RHODE ISLAND AVE AND T ST, NW	3007	16	137-Q
2ND ST & RHODE ISLAND AVE & SEATON RD,NW	3008	22	439-D
3RD ST AND M ST AND NEW YORK AVE, NW	3009	30	1593
3RD ST AND RHODE ISLAND AVE, NW	3010	33	440-E
4TH ST AND NEW JERSEY AVE AND P ST, NW	3011	40	199-B
4TH ST AND NEW YORK AVE, NW	3012	41	256-H
4TH ST, S ST, FLA AVE, RHODE IS AVE, NW	3013	43	151-F
4TH ST AND T ST, NW	3014	44	1450
5TH ST AND FLA AVE, NEW JERSEY AVE, NW	3015	47	312-E
6TH ST AND O ST, NW	3016	66	983-C
6TH ST AND P ST, NW	3017	67	1120-D
6TH ST AND Q ST, NW	3018	69	762-C
6TH ST AND R ST AND RHODE ISLAND AVE, NW	3019	70	168-I
6TH ST AND S ST, NW	3020	71	1115-C
6TH ST AND T ST AND FLORIDA AVE, NW	3021	72	112-I
7TH ST AND O ST, NW	3022	88	995-B
7TH ST AND P ST, NW	3023	89	996-B
7TH ST AND Q ST, NW	3024	91	997-B
7TH ST AND R ST AND RHODE ISLAND AVE, NW	3025	92	120-J
7TH ST AND S ST, NW	3026	93	998-F
NEW JERSEY AVE AND Q ST, NW	3027	369	935-A
NEW JERSEY AVE AND R ST, NW	3028	370	936-A
RHODE ISLAND AVE,NEW JERSEY AVE,S ST, NW	3029	373	155-H
1ST ST AND FLA AVE AND ECKINGTON PL, NE	3030	388	131-B
1ST ST AND O ST AND NEW YORK AVE, NE	3031	394	218-P
4TH ST AND RHODE ISLAND AVE, NE	3032	395	185-F
FLORIDA AVE AND NEW YORK AVE, NE	3033	401	175-K
LINCOLN RD AND T ST, NE	3034	402	1066
LINCOLN RD AND RHODE IS AVE AND U ST, NE	3035	403	136-I
RHODE IS AVE AND V ST AND SUMMIT PL, NE	3036	404	314-D
N CAPITOL ST AND FLORIDA AVE	3037	481	524-D

N CAPITOL ST AND LINCOLN RD	3038	487	403-A
N CAPITOL ST AND NEW YORK AVE	3039	489	473-O
N CAPITOL ST AND P ST	3040	490	856-C
N CAPITOL ST AND R ST AND LINCOLN RD	3041	491	712-C
N CAPITOL ST AND RANDOLPH ST	3042	492	1269
N CAPITOL ST AND RHODE ISLAND AVE	3043	493	196-K
RHODE ISLAND AVE AND R ST, MARION ST, NW	3044	374	474-A
NEW JERSEY AVE,NEW YORK AVE AND M ST, NW	3045	510	1594-A
2ND ST AND C ST, NE	3046	517	868-A
2ND ST AND D ST, NE	3047	518	1156-C
2ND ST AND K ST, NE	3048	519	1109-A
2ND ST AND MARYLAND AVE & CONSTIT AVE,NE	3049	520	97.1-E
2ND ST AND MASS AVE, NE	3050	521	209-A
3RD ST AND D ST & MASS AVE, NE	3051	522	370-F
3RD ST AND H ST, NE	3052	523	1107-F
3RD ST AND K ST, NE	3053	524	1108
3RD ST AND MARYLAND AV & CONSTIT AV, NE	3054	525	97-2-G
4TH ST AND C ST & MASS AV, MD AV, NE	3055	526	319-G
4TH ST AND CONSTIT AV, NE	3056	527	862
4TH ST AND D ST, NE	3057	528	1155
4TH ST AND E ST, NE	3058	529	1075
4TH ST AND F ST, NE	3059	530	1076
4TH ST AND FLORIDA AV, NE	3060	531	612-C
4TH ST AND H ST, NE	3061	532	1130-B
4TH ST AND K ST, NE	3062	533	1088-A
4TH ST AND M ST, NE	3063	534	1087-A
4TH ST AND T ST, NE	3064	535	454-C D
4TH ST. AND T ST, NE	3064	535	454-C
5TH ST AND C ST, NE (SOUTH)	3065	536	318-1-B
5TH ST AND C ST, NE (NORTH)	3066	537	319-1-B
5TH ST AND FLORIDA AV, NE	3067	538	1131-D
5TH ST AND K ST, NE	3068	539	579
6TH ST AND C ST & MASS AV & MD AV, NE	3069	540	318-D
6TH ST AND CONSTITUTION AV, NE	3070	541	863-A
6TH ST AND D ST, NE	3071	542	1157
6TH ST AND E ST, NE	3072	543	1077
6TH ST AND F ST,NE	3073	544	1078
6TH ST AND FLORIDA AV, NE	3074	545	630-D
6TH ST AND H ST, NE	3075	546	683-B
6TH ST AND K ST, NE	3076	547	694
6TH ST AND M ST, NE	3077	548	610-A
7TH ST AND 8TH ST & MASS AV & CONSTIT,NE	3078	549	355-B
7TH ST AND H ST, NE	3079	550	684-B
7TH ST AND K ST, NE	3080	551	1176
8TH ST AND C ST, NE	3081	552	652-A
8TH ST AND FLORIDA AV & GALLAUDET DR, NE	3082	553	470-E
8TH ST AND H ST, NE	3083	554	685-F

8TH ST AND K ST & W VIRGINIA AV, NE	3084	555	121-B
8TH ST AND MARYLAND AV, NE	3085	556	231
9TH ST AND C ST, NE	3086	557	322
9TH ST AND CONSTIT AV, NE	3087	558	864-A
9TH ST AND H ST, NE	3088	559	686-C
9TH ST AND MARYLAND AV & E ST, NE	3089	560	224-E
9TH ST AND MASS AV, NE	3090	561	133-A
9TH ST & T ST NE	3091	562	253-I
10TH ST AND H ST, NE	3092	563	687-C
10TH ST AND OTIS ST & BUNKER HILL RD, NE	3093	564	1508
11TH ST AND C ST, NE	3094	565	869-A
11TH ST AND CONSTIT AV, NE	3095	566	865
11TH ST AND H ST, NE	3096	567	688-B
11TH ST AND MARYLAND AV, NE	3097	568	703-A
12TH ST AND F ST & MARYLAND AV, NE	3098	569	469-A
12TH ST AND FL AV & K ST & MONT. AV, NE	3099	570	156-D
12TH ST AND H ST, NE	3100	571	689-C
12TH ST AND VARNUM ST, NE	3101	572	835-A
13TH ST AND C ST, NE	3102	573	870-A
13TH ST AND CONSTIT AV & TENN AV, NE	3103	574	337-A
13TH ST AND FLORIDA AV, NE	3104	575	1234-A
13TH ST AND H ST, NE	3105	576	690-B
13TH ST AND MARYLAND AV, NE	3106	577	704-A
13TH ST AND VARNUM ST,NE	3107	578	1212
14TH ST AND C ST, NE	3108	579	327-B
14TH ST AND CONSTIT AV & N CAROL. AV, NE	3109	580	331-A
14TH ST AND H ST, NE	3110	581	672-C
14TH ST AND MARYLAND AV, NE	3111	582	1112-B
15TH ST AND C ST, NE	3112	583	871
15TH ST AND D ST, NE	3113	584	1394
15TH ST AND H ST & BENNING RD, NE	3114	585	11-M
15TH ST AND N CAROLINA AV, NE	3115	586	866
17TH ST AND BENNING RD, NE	3116	587	139-J
17TH ST AND BLADENSBURG RD	3117	588	1690-A
17TH ST AND C ST, NE	3118	589	764-B
17TH ST AND CONSTIT AV, NE	3119	590	1006
17TH ST AND D ST, NE	3120	591	1256
17TH ST AND GALES ST, NE	3121	592	1218-A
17TH ST AND I ST & HECHINGER MALL, NE	3122	593	1515
17TH ST AND L ST, NE	3123	594	1113-A
17TH ST AND M ST, NE	3124	595	1038-A
17TH ST AND MARYLAND AV, NE	3125	596	1007-A
17TH ST AND MONTANA AV & BRYANT ST, NE	3126	597	1235
18TH ST AND C ST, NE	3127	598	765
18TH ST AND MONTANA AV & W ST, NE	3128	599	324-E
19TH ST AND BENNING RD, NE	3129	600	1012-B
19TH ST AND C ST, NE	3130	601	766-A

19TH ST AND E ST, NE	3131	602	1461
21ST ST AND BENNING RD, NE	3132	603	1016-A
21ST ST AND C ST, NE	3133	604	339-G
BENNING RD AND 16TH ST, NE	3134	605	1512
BENNING RD AND 24TH ST, NE	3135	606	1315
BENNING RD AND 26TH ST, NE	3136	607	1282
BENNING RD AND OKLAHOMA AV, NE	3137	608	153-I
BLADENSBURG RD AND 25TH ST & V ST, NE	3138	609	277-C
BLADENSBURG RD AND 30TH ST, NE	3139	610	26-C
BLADENSBURG RD AND EARL PL & BANNEKER,NE	3140	611	1504-A
BLADENSBURG RD AND EASTERN AV, NE	3141	612	252-G
BLADENSBURG RD AND MONTANA AV & S ST, NE	3142	613	251-I
BLADENSBURG RD AND MORSE ST, NE	3143	614	1414-A
BLADENSBURG RD AND OATES ST & K ST, NE	3144	615	1149
BLADENSBURG RD AND QUEENS CHAPEL RD, NE	3145	616	556-E
BLADENSBURG RD AND S.DAKOTA AVE , NE	3146	617	297-N
BRENTWOOD RD AND 9TH ST AND V ST, NE	3147	618	542-G
BRENTWOOD RD AND SARATOGA AVE, NE	3148	619	193-D
BRENTWOOD RD AND W ST, NE	3149	620	1341-F
EASTERN AVE AND VARNUM ST, NE	3150	621	1057
FLORIDA AVE AND WEST VA. AVE, NE	3151	622	611-H
FRANKLIN ST AND 10TH ST, NE	3152	623	1182
FRANKLIN ST AND 12TH ST, NE	3153	624	1132-A
FRANKLIN ST AND 13TH ST, NE	3154	625	498-A
FRANKLIN ST AND 14TH ST, NE	3155	626	1172
FRANKLIN ST AND 18TH ST, NE	3156	627	1004-B
FRANKLIN ST AND 20TH ST, NE	3157	628	1392-B
FRANKLIN ST AND MILLS AVE AND 24TH ST NE	3158	629	1434-B
MICHIGAN AVE AND 10TH ST, NE	3159	630	1105-E
MICHIGAN AVE AND 12TH ST, NE	3160	631	194-C
MICH AVE AND 13TH ST AND TAYLOR ST, NE	3161	632	178-L
MICHIGAN AVE AND 14TH ST, NE	3162	633	1048
MICH AVE AND 18THST AND VARNUM ST, NE	3163	634	329-G
MICHIGAN AVE, ALLISON ST, QUEENSCHPL,NE	3164	635	1249-A
MICHIGAN AVE AND EASTERN AVE, NE	3165	636	219-E
MICH AV AND S DAKOTA AV AND 16TH ST, NE	3166	638	245-D
MONROE ST AND 9TH ST, NE	3167	639	1488
MONROE ST AND 10TH ST, NE	3168	640	1305-B
MONROE ST AND 12TH ST, NE	3169	641	724-D
MONROE ST AND 13TH ST, NE	3170	642	711-A
MONROE ST AND 14TH ST, NE	3171	643	1415
MONROE ST AND 18TH ST, NE	3172	644	1005-A
MONROE ST AND 20TH ST, NE	3173	645	1420
MONROE ST AND 22ND ST, NE	3174	646	1224-A
MT OLIVET RD & BRENTWOOD PKY, NE	3175	647	273-A
MT OLIVET RD & BRENTWOOD PKY & E RAMP,NE	3176	648	597-D
MT OLIVET RD AND W VIRGINIA AVE, NE	3177	649	150-G

NEW YORK AVE AND 4TH ST, NE	3178	650	1181-B
NEW YORK AVE AND 16TH ST, NE	3179	651	806
NEW YORK AVE AND BLADENSBURG RD, NE	3180	652	290-M
NEW YORK AVE AND FAIRVIEW AVE, NE	3181	653	1519
NEW YORK AVE AND FENWICK ST, NE	3182	654	805
NEW YORK AVE AND KENDALL ST, NE	3183	655	727
3RD STREET, 4TH STREET & FLORIDA AVE.NW	3184	1395	1618-B
NEW YORK AVE & MONTANA AV & W VA AVE, NE	3185	657	49.1
RHODE ISLAND AVE & 10TH ST & BRYANT, NE	3186	658	1054-A
RHODE ISLAND AVE & 12TH ST & SARATOGA,NE	3187	659	510-F
RHODE ISLAND AVE & 13TH ST & BRENT RD,NE	3188	660	430-J
RHODE ISLAND AVE & 14TH ST & MONT AV, NE	3189	661	505
RHODE ISLAND AVE & 18TH ST, NE	3190	662	101-E
RHODE ISLAND AVE & 20TH ST, NE	3191	663	507-A
RHODE ISLAND AVE & EASTERN AVE, NE	3192	664	506-D
RHODE ISLAND AVE & FRANKLIN ST, NE	3193	665	641-B
RHODE ISLAND AVE & MILLS AVE, NE	3194	666	508-C
RHODE ISLAND AVE & MONROE ST & 28 ST, NE	3195	667	504-B
RHODE ISLAND AVE & REED ST, NE	3196	668	1435-E
RHODE ISLAND AVE & S DAK AV, NE	3197	669	499.2-C
SARGENT RD AND EASTERN AVE, NE	3198	670	1251-B
SARGENT RD AND GALLATIN ST, NE	3199	671	1297-B
S DAKOTA AVE AND 12TH ST, NE	3200	672	719
S DAKOTA AVE & 14TH ST & WEBSTER ST,NE	3201	673	1241-B
S DAKOTA AVE & 18TH ST & SHEPHERD ST, NE	3202	674	876-A
S DAKOTA AVE & 20TH ST, NE	3203	675	1326-A
S DAKOTA AVE & 22TH ST & NEWTON ST, NE	3204	676	1460-A
S DAKOTA AVE & CARLTON AVE, NE	3205	677	1239
S DAKOTA AVE & DELAFIELD ST, NE	3206	678	1240
S DAKOTA AVE & DOUGLAS ST & 31TH PL, NE	3207	679	1493-A
S DAKOTA AVE & GALLOWAY ST, NE	3208	680	633-D
S DAKOTA AVE & HAMILTON ST, NE	3209	681	877-A
S DAKOTA AVE & MONROE ST, NE	3210	682	1127-E
S DAKOTA AVE & QUINCY ST & PERRY ST, NE	3211	683	1242-A
S DAKOTA AVE & SARGENT RD, NE	3212	684	1097-B
S DAKOTA AVE & TAYLOR ST, NE	3213	685	716-B
S DAKOTA AVE & VISTA ST, NE	3214	686	1000-D
TAYLOR ST & 7TH ST & PUERTO RICO AVE, NE	3215	687	1407-J
TAYLOR ST & 10TH ST, NE	3216	688	1391-E
TAYLOR ST & 12TH ST, NE	3217	689	834-D
TENNESSEE AVE AND C ST, NE	3218	690	325
26TH ST AND BLADENSBURG RD ,NE	3219	1344	1462-B
BLADENSBURG AND ARBORETUM ENTRANCE NE	3220	1442	1666
E CAPITOL ST & 14TH ST	3221	757	858-A
E CAPITOL ST & 15TH ST	3222	758	859-A
E CAPITOL ST & 17TH ST	3223	759	860-A
E CAPITOL ST & 19TH ST	3224	760	861-B

M ST AND NY AVE METRO PED CROSSING NE	3225	1448	1715-A
3RD STREET AND FLORIDA AVENUE , NE	3226	1449	1713
4TH ST AND LINCOLN RD,NE	3227	946	466-B
FRANKLIN ST AND 4TH ST,NE	3228	948	573-A
FRANKLIN ST AND 7TH ST,NE	3229	949	1129-D
FRANKLIN ST AND LINCOLN RD,NE	3230	950	271-B
MICHIGAN AVE & 4TH ST & HAREWOOD RD,NE	3231	952	191-E
MICHIGAN AVE AND 7TH ST,NE	3232	953	1096-B
M ST AND DELAWARE NE	3233	1447	1714
MICHIGAN AVE AND IRVING ST,NE	3234	955	429-A
MICHIGAN AVE AND MONROE ST,NE	3235	956	362-K
MONROE ST AND 7TH ST,NE	3236	957	1248
5TH ST AND NEW YORK AVE AND L ST, NW	3238	52	192-G
4TH ST AND BRYANT ST,NW	3239	773	811-D
4TH ST & HOWARD UNI ENT & MCMILLAN DR,NW	3240	775	246-C
4TH ST AND W ST,NW	3241	776	1345-F
5TH ST AND CONSTITUTION AVE, NE	3242	1304	1340-A
RHODE ISLAND & SHOPPING PLAZA, NE	3243	469	1536-B
FLORIDA AVE AND P ST, NE	3244	1288	1533-B
4TH ST AND BRYANT ST, NE	3245	962	1537
NEW YORK AVE AND MT OLIVET RD, NE	3246	1286	1547
9TH ST AND NEW YORK AVE, NE	3247	1285	1546
SOUTH DAKOTA AVE AND 33RD PL, NE	3248	1301	1540
24TH ST AND RHODE ISLAND AVE.,NE	3249	1337	499.1-B
7TH ST AND FLORIDA AV NE	3250	1444	1695-A
MT OLIVET RD, AND TRINIDAD AVE, N.E.	3251	1375	1294-A
BLADENSBURG AND MT. OLIVET ROADS NE	3252	1443	1689-A
NEW JERSEY AVE AND N ST, NW	3253	1331	1561-A
SOUTH DAKOTA AVE AND GALLATIN ST, NE	3254	1348	1575-C
4TH STREET AND DOUGLAS STREET, NE	3255	1354	1491-A
H STREET AND STATION PL. ,NE	3430	1451	1698
S DAKOTA AVE & KENNEDY ST NE	3431	1470	1683
W VIRGINIA AVE AND FENWICK, NE	3432	1471	1682
22ND AND EAST CAPITOL (SOUTH SIDE)	3433	1474	1718
22ND AND EAST CAPITOL (NORTH SIDE)	3435	1475	1717
12TH AND CONSTITUTION NE	3436	1477	1744
OVERLOOK AVE AND ENTRANCE TO BOLLING AFB	4001	1090	1523-A
EASTERN AVE AND 63RD ST & DIX ST, NE	4002	995	294-D
1ST ST & N CAROL AVE & E ST & NJ AVE, SE	4003	691	366-H
2ND ST & D ST (NORTH), SE	4004	692	1167
2ND ST & PENN AVE & INDEP AVE, SE	4005	9693	170-C
2ND ST & PENN AVE & INDEP AVE SE	4005	693	170-B
3RD ST & D ST & N CAROL AVE, SE	4006	694	342
3RD ST & E ST, SE	4007	695	1106
3RD ST & PENN AVE & INDEP AVE, SE	4008	696	343-F
3RD ST & VIRGINIA AVE, SE	4009	697	769-D
4TH ST & E ST, SE	4010	698	1219

4TH ST & INDEP AVE, SE	4011	699	1064
4TH ST & N CAROL AVE & SEWARD SQ, SE	4012	700	1166-A
4TH ST & PENN AVE, SE	4013	701	172-C
4TH ST & VIRGINIA AVE (NORTH SIDE), SE	4014	702	1174-C
5TH ST & RAMP I & VIRGINIA AVE, SE	4015	703	259-D
6TH ST & INDEP AVE, SE	4016	704	1065-B
6TH ST & NORTH CAROLINA AVE, SE	4017	705	944
6TH ST & PENN AVE, SE	4018	706	320-C
6TH ST & S CAROLINA AVE & E ST, SE	4019	707	1188
6TH ST & VIRGINIA AVE, SE	4020	708	180-C
7TH ST & 8TH ST & INDEP AV & NC AVE, SE	4021	709	353-C.1
7TH ST & I ST & VIRGINIA AVE, SE	4022	710	448-A
7TH ST & K ST & VIRGINIA AVE, SE	4023	711	937-B
7TH ST & PENN AVE, SE	4024	712	173-C
8TH ST & G ST, SE	4025	713	1383-C
8TH ST & I ST, SE	4026	714	770-A
8TH ST & M ST, SE	4027	715	105-J
8TH ST & PENN AVE, SE	4028	716	323-A
8TH ST & VIRGINIA AVE & RAMP D, SE	4029	717	590-H
9TH ST & INDEP AVE, SE	4030	718	1062
9TH ST & M ST,SE	4031	719	658-F
9TH ST & PENN AVE, SE	4032	720	681-A
10TH ST & N CAROLINA AVE, SE	4033	721	1121
11TH ST & C ST, SE	4034	722	959-A
11TH ST & E ST & PENN AVE, SE	4035	723	174-F
11TH ST & G ST, SE	4036	724	1373-A
11TH ST & I ST, SE	4037	725	972-C TP
11TH ST & INDEP AVE, SE	4038	726	1063-D
11TH ST & M ST, SE	4039	727	93-P
11TH ST & RAMP N, SE	4040	728	638-G
11TH ST & S CAROLINA AVE, SE	4041	729	976
12TH ST & PENN AVE, SE	4042	730	1148-A
13TH ST & I ST & POTOMAC AVE, SE	4043	731	1035
13TH ST & INDEP AVE & KENTUCKY AVE, SE	4044	732	332-C
13TH ST & PENN AVE & G ST, SE	4045	733	1333
14TH ST, 15TH ST, MASS,INDEP & SC AV, SE	4046	734	364-D
14TH ST & D ST & KENTUCKY AVE, SE	4047	735	1042-C
14TH ST & PENN AVE & POTOMAC AV(EAST),SE	4048	736	254-2-B
14TH ST & PENN AVE & POTOMAC AV(WEST),SE	4049	737	254-1-D
15TH ST & G ST & KENTUCKY, POTOMAC AV,SE	4050	738	367-B
15TH ST & PENN AVE, SE	4051	739	161-B
17TH ST & INDEP AVE, SE	4052	740	838
17TH ST & MASS AVE, SE	4053	741	797-A
17TH ST & POTOMAC AVE, SE	4054	742	969-A
19TH ST & INDEP AVE, SE	4055	743	336-E
19TH ST & MASS AVE, SE	4056	744	1227-A
PENN AVE & N CAROLINA AVE, SE	4057	745	171-C

S CAROLINA AVE & KENTUCKY AVE & C ST, SE	4058	746	1067
SO EAST FREEWAY & SOUSA BRIDGE, SE	4059	747	1451-E
BARNEY CIRCLE, SE	4060	748	113-U
E CAPITOL ST & 2ND ST	4061	749	399-A
E CAPITOL ST & 3RD ST	4062	750	848-A
E CAPITOL ST & 4TH ST	4063	751	872
E CAPITOL ST & 6TH ST	4064	752	873-A
E CAPITOL ST & 8TH ST	4065	753	651
E CAPITOL ST & 9TH ST	4066	754	134-A
BENNING RD AND 34TH ST, NE	4067	982	247-F
BENNING RD AND 36TH ST EAST, NE	4068	983	1344-A
BENNING RD AND 42ND ST, NE	4069	984	666
BENNING RD AND 44TH ST, NE	4070	985	717-B
BENNING RD AND ANACOSTIA AVE, NE	4071	986	1217-B
BENNING RD AND MINNESOTA AVE, NE	4072	987	44-N
NH BURROUGHS AVE AND 44 ST & HUNT PL, NE	4073	988	1111-A
NH BURROUGHS AVE AND 49TH ST, NE	4074	989	407-B
NH BURROUGHS AVE AND 55TH ST, NE	4075	990	1423
NH BURROUGHS AVE AND 58TH ST, NE	4076	991	1165-A
NH BURROUGHS AVE AND DIVISION AVE, NE	4077	992	1049-A
NH BURROUGHS AVE AND KENILWORTH AVE, NE	4078	993	234-F
NH BURROUGHS AVE AND MINNESOTA AVE, NE	4079	994	1467-H
EASTERN AVE AND KENILWORTH AVE, NE	4080	996	269-B
MINNESOTA AVE AND DIX ST, NE	4081	997	752-B
MINNESOTA AVE AND EASTERN AVE, NE	4082	998	569-D
MINNESOTA AVE AND GRANT ST, NE	4083	999A	1494-C
SHERIFF ROAD AND 45TH ST & 45TH PL, NE	4084	1000	1232
SHERIFF ROAD AND 49TH ST, NE	4085	1001	985-A
SHERIFF ROAD AND EASTERN & DIVISION, NE	4086	1002	384-C
ALABAMA AVE AND 11TH PL & GATE #5,SE	4087	1003	1397
ALABAMA AVE AND 23 & SUITLAND PKWY,SE	4088	1004	395-C2
ALABAMA AVE AND 25TH ST, SE	4089	1005	436-A
ALABAMA AVE AND 30TH ST, SE	4090	1006	665-E
ALABAMA AVE AND 36TH ST & SUITLAND RD,SE	4091	1007	1252-A
ALABAMA AVE AND 38TH ST, SE	4092	1008	1197-B
ALABAMA AVE AND AINGER PL, SE	4093	1009	1187
ALABAMA AVE AND BRANCH AVE, SE	4094	1010	965-J
ALABAMA AVE AND CONGRESS ST, SE	4095	1011	1410
ALABAMA AVE AND GOOD HOPE RD, SE	4096	1012	404-I
ALABAMA AVE AND IRVING ST & JASPER ST,SE	4097	1013	1210
ALABAMA AVE AND MASSACHUSETTS AVE, SE	4098	1014	1205
ALABAMA AVE AND NAYLOR RD, SE	4099	1015	382-C
ALABAMA AVE AND PENNSYLVANIA AVE, SE	4100	1016	217-G
ALABAMA AVE AND RANDLE PL	4101	1017	1186
ALABAMA AVE AND STANTON RD, SE	4102	1018	671-B
SOUTHERN AVE AND BRANCH AVE, SE	4103	1070	1126-D
ALABAMA AVE AND STANTON TER & 21ST ST,SE	4104	1020	1185

ALABAMA AVE AND WHEELER RD, SE	4105	1021	725-F
ATLANTIC ST AND 1ST ST, SE	4106	1022	1202-A
ATLANTIC ST AND 4TH ST, SE	4107	1023	939-A
ATLANTIC ST AND LIVINGSTON & VALLEY, SE	4108	1024	1432-D
BENNING RD AND C ST, SE	4109	1025	1401-B 2
BENNING RD AND F ST, SE	4110	1026	1034-B
BENNING RD AND G ST, SE	4111	1027	1228
BENNING RD AND H ST, SE	4112	1028	1079
FIRTH STERLING AVE AND HOWARD RD, SE	4113	1029	1338-E
GOOD HOPE RD AND 13TH ST, SE	4114	1030	644-B
GOOD HOPE RD AND 14TH ST, SE	4115	1031	1215
GOOD HOPE RD AND 16TH ST, SE	4116	1032	1208-B
GOOD HOPE RD AND 25TH ST, SE	4117	1033	340-C
GOOD HOPE RD AND ML KING AVE, SE	4118	1034	434-M
GOOD HOPE RD AND MINNESOTA AVE	4119	1035	272-E
GOOD HOPE RD AND NAYLOR RD, SE	4120	1036	676-D
HOWARD RD AND SUITLAND PKWY RAMP B SE	4121	1037	TS-1590-A
ML KING AVE AND ALABAMA AVE & 5TH ST, SE	4122	1038	299-A
ML KING AVE & CHICAGO ST & MORRIS RD, SE	4123	1039	1384-B
ML KING AVE & HOWARD RD & SHERIDAN RD,SE	4124	1040	238-F
ML KING AVE AND PORTLAND ST, SE	4125	1041	966-D
ML KING AVE & RANDLE PL & RALEIGH PL, SE	4126	1042	1171-B
ML KING AVE AND ST ELIZABETH GATE #1, SE	4127	1043	378-D
ML KING AVE AND ST ELIZABETH GATE #4, SE	4128	1044	855-B
ML KING AVE AND SUMNER RD & STANTON RD	4129	1045	932-E
ML KING AVE & TRENTON & SAVANNAH, SE	4130	1046	1061
ML KING AVE AND W ST, SE	4131	1047	682-D
MINNESOTA AVE AND 22ND ST & NAYLOR RD,SE	4132	1049	283-C
MINNESOTA AVE AND 23RD ST, SE	4133	1050	1375
MINNESOTA AVE AND B ST AND 36TH ST, SE	4134	1051	1191
MINNESOTA AVE AND ELY PL, SE	4135	1052	1053-A
MINNESOTA AVE AND NELSON PL, SE	4136	1053	1229
MINNESOTA AVE AND RANDLE CIRCLE, SE	4137	1054	1041
MISSISSIPPI AVE AND 4TH ST, SE	4138	1055	1216-A
NAYLOR RD AND 30 ST & GAINESVILLE ST, SE	4139	1056	1233
PENNSYLVANIA AVE AND 27TH ST & O ST, SE	4140	1057	270-C
PENNSYLVANIA AVE AND 28TH ST, SE	4141	1058	1335-A
PENNSYLVANIA AVE AND 30TH ST, SE	4142	1059	970-D
PENNSYLVANIA AVE AND 31ST ST, SE	4143	1060	1454
PENNSYLVANIA AVE AND 38TH ST, SE	4144	1061	1196
PENNSYLVANIA AVE AND BRANCH AVE, SE	4145	1063	143-J
PENNSYLVANIA AVE AND MINNESOTA AVE, SE	4146	1064	118.2-B
PENNSYLVANIA AVE AND SOUTHERN AVE, SE	4147	1065	986-E
RIDGE RD AND B ST AND 37TH ST	4148	1066	603
RIDGE RD AND BOWEN RD & 44TH PL, SE	4149	1067	1379
SOUTHERN AVE AND 23RD ST, SE	4150	1068	1478-B
SOUTHERN AVE AND BOWEN RD & 46TH ST, SE	4151	1069	984-D

SOUTHERN AVE AND CENTRAL AVE, SE	4152	1071	1247
SOUTHERN AVE AND CHESAPEAKE ST, SE	4153	1072	1207-B
SOUTHERN AVE AND MASSACHUSETTS AVE, SE	4154	1073	1505
SOUTHERN AVE AND MISSISSIPPI AVE, SE	4155	1074	1496
SOUTHERN AVE AND OWENS RD & BONINI RD,SE	4156	1075	1483
SOUTHERN AVE AND SUITLAND RD, SE	4157	1076	967-B
STANTON RD AND BRUCE PL, SE	4158	1077	1284
SUITLAND PARKWAY & FIRTH STERLING AVE,SE	4159	1078	394-J
TEXAS AVE AND C ST, SE	4160	1081	1382
TEXAS AVE AND RIDGE RD, SE	4161	1082	1278-A
VALLEY AVE AND 4TH ST & XENIA ST, SE	4162	1083	1348-B
WHEELER RD AND BARNABY ST, SE	4163	1084	934-A
WHEELER RD AND MISSISSIPPI AVE, SE	4164	1085	730-C
WHEELER RD AND SOUTHERN AVE, SE	4165	1086	774-F
WHEELER RD AND VALLEY AVE, SE	4166	1087	1286-A
WHEELER RD AND WAHLER PL, SE	4167	1088	1285-A
ML KING AVE AND CHESAPEAKE ST, SW	4168	1089	1180-B
OVERLOOK AVE AND CHESAPEAKE ST, SW	4169	1091	705-F
OVERLOOK AVE AND LABORATORY RD, SW	4170	1092	TS1365-D
EAST CAPITOL ST AND 49TH ST	4172	1095	1095-A
EAST CAPITOL ST AND 50TH ST	4173	1096	222-B
EAST CAPITOL ST AND 53RD ST	4174	1097	1277-B
EAST CAPITOL ST AND 55TH ST	4175	1098	1040-A
EAST CAPITOL ST AND 56TH PL	4176	1099	1444
EAST CAPITOL ST AND 58TH ST	4177	1100	1074-A
EAST CAPITOL ST AND BENNING RD	4178	1101	221-H
E CAPITOL ST & MINNESOTA AVE & RIDGE RD	4179	1102	1544-A
EAST CAPITOL ST AND SOUTHERN AVE	4180	1103	293-F
EAST CAPITOL ST AND STODDERT PL	4181	1104	1393
SOUTH CAPITOL ST & 1ST ST & GALVESTON ST	4182	1105	875-H
SOUTH CAPITOL ST AND ATLANTIC ST	4183	1106	186-B
SOUTH CAPITOL ST AND CHESAPEAKE ST	4184	1107	1147-A
SOUTH CAPITOL ST AND ELMIRA ST	4185	1108	1058
SOUTH CAPITOL ST AND FIRTH STERLING AVE	4186	1109	311-D
SOUTH CAPITAL AND HOWARD RD	4187	1110	
EAST CAPITOL STREET AND DIVISION AVE	4187	1462	1710
S CAPITOL ST AND ML KING AVE & HALLEY PL	4188	1111	206-E
SOUTH CAPITOL ST AND LIVINGTON RD	4189	1112	1349-C
SOUTH CAPITOL ST AND SOUTHERN AVE	4190	1115	406-F
S CAPITOL ST AND SUITLAND PKWY	4191	1116	261-E
13TH ST AND SOUTHERN AVE, SE	4192	1336	1555-A
SUITLAND PARKWAY AND NAYLOR RD, SE	4193	1079	1060-D
22ND AND ALABAMA	4195	1461	395-C1
SUITLAND PARKWAY AND STANTON RD, SE	4196	1080	326-I
BRANCH AVE AND ERIE ST, SE	4197	1478	1736
ANACOSTIA FRWY AND DC LINE SW DET STA	4199	1093	N/A
BENNING RD AND 36TH ST WEST, NE	4200	1117	1511

PENNSYLVANIA AVE AND L'ENFANT SQ, SE	4201	1118	118.1-B
29TH ST, FIRE ST, P ST & PENN. AVE, SE	4202	1464	1735
13TH STREET AND ALABAMA AVE, SE	4204	1412	1660
SOUTHERN AVE S. VALLEY TERR. & WMATA DWY	4205	1413	1658
SOUTHERN AVE & WMATA ACCESS RD SE	4206	1414	1659
EASTERN AVE AND OLIVE, NE	4207	1445	1686
E CAPITOL ST & 11TH ST	4219	755	160.2
E CAPITOL ST & 13 STREET,SE	4220	756	1604
E CAPITOL & 11TH ST & N CAROLINA AVE, SE	4221	761	160.3
E CAPITOL & 11TH ST & MASS AVE, NE	4222	763	160.1
7TH ST AND ALABAMA AVE, SE	4223	1294	1183
M. L. KING AVE AND TALBERT ST, SE	4224	1295	1534-B
GOOD HOPE RD AND MARBURY PLAZA APTS, SE	4225	1306	1548-B
E CAPITOL ST & 13 ST,MASS AVE. SE	4226	1396	1605
BENNING ROAD AND C ST,SE (NORTH)	4227	1340	1401-B 1
E CAPITOL ST. 13TH ST & N. CAROLINA, NE	4228	1397	1603-A
16TH ST AND MINNESOTA AVE, SE	4229	1335	1559
E.CAPITOL ST,AMES ST.,AND MN. AVE	4230	1345	1543-A
8TH ST & E ST, SE	4231	1468	1737
36TH PLACE AND ALABAMA AVE, SE	4232	1349	1579
BENNING ROAD AND E STREET, SE	4233	1355	1587
BENNING ROAD AND 46TH STREET, SE	4234	1356	1588
PA AVE.,FAIRLAWN AVE., AND ANAC. RAMP,SE	4236	1347	1449-B
WHEELER RD,AND CONGRESS ST SE	4237	1432	1704
I-295 AT MALCOLM X AVE SE	4238	1437	1675
PENNSYLVANIA AVE AND TEXAS AVE, SE	4239	1469	1727
EAST CAPITOL ST AND DIVISION AVE.	4241	1439	
HOWARD RD AND ANACOSTIA METRO STATION SE	4246	1357	1585-A
HOWARD RD AND ANACOSTIA FRWY, RMP 13 SE	4247	1358	1589-A
BENNING RD AND SOUTHERN AVE S.E.	4248	1379	1591-A
SOUTH CAPITOL AND PORTLAND AVE	4249	1114	225-F
1ST ST AND BRYANT ST,NW	5001	766	790-C
1ST ST AND IRVING ST,NW	5002	767	1213-E
1ST ST AND MICHIGAN AVE,NW	5003	768	268-G
3RD ST AND JEFFERSON ST & KANSAS AVE,NW	5004	769	608-D
3RD ST AND KENNEDY ST,NW	5005	770	478-A
3RD ST AND MISSOURI AVE,NW	5006	771	373-G
3RD ST AND SHERIDAN ST & N DAKOTA AVE,NW	5007	772	1276
NEW HAMPSHIRE AVE. & RANDOLPH ST., N.W.	5008	1380	1602-A
4TH ST AND CEDAR ST & BLAIR RD, NW	5009	774	213-I
GEORGIA AVE AND SHEPHERD ST., N.W.	5010	1381	1600-A
GEORGIA AVE AND QUINCY ST., N.W.	5011	1382	1601-A
5TH ST AND CEDAR ST,NW	5012	777	857
5TH ST AND GALLATIN ST,NW	5013	778	1199
5TH ST AND HARVARD ST,NW	5014	779	471-A
5TH ST AND KANSAS AVE,NW	5015	780	1050
5TH ST AND KENNEDY ST,NW	5016	781	1068-B

5TH ST AND MISSOURI AVE,NW	5017	782	789
5TH ST, PK PL, ROCK CRK CH RD, QUINCY,NW	5018	783	284-F
5TH ST AND SHERIDAN ST,NW	5019	784	1069
5TH ST AND UPSHUR ST,NW	5020	785	1098-B
5TH ST AND VAN BUREN ST,NW	5021	786	1257
8TH ST AND MISSOURI AVE,NW	5022	787	1367-A
11TH ST AND COLUMBIA RD,NW	5023	788	828-B
11TH ST AND EUCLID ST,NW	5024	789	1311
11TH ST AND FLORIDA AVE,NW	5025	790	836-A
11TH ST AND HARVARD ST,NW	5026	791	831
11TH ST AND IRVING ST,NW	5027	792	832-B
11TH ST AND KENYON ST,NW	5028	793	1072-A
11TH ST AND PARK RD,NW	5029	794	1071-B
13TH ST AND ALASKA AVE & HEMLOCK ST, NW	5030	795	1258
13TH ST & ARKANSAS AVE & DECATUR ST,NW	5031	796	228-C
13TH ST AND CLIFTON ST,NW	5032	797	1310
13TH ST & COLORADO AVE & NICHOLSON ST,NW	5033	798	274-F
13TH ST AND COLUMBIA RD,NW	5034	799	924
13TH ST AND EUCLID ST,NW	5035	800	802
13TH ST AND FLORIDA AVE,NW	5036	801	798-B
13TH ST AND FT STEVENS DR,NW	5037	802	1200-A
13TH ST AND GALLATIN ST,NW	5038	803	1361
13TH ST AND HARVARD ST,NW	5039	804	923
13TH ST AND IOWA AVE & BUCHANAN ST,NW	5040	805	1073-B
13TH ST AND IRVING ST,NW	5041	806	925-A
13TH ST AND KANSAS AVE & SPRING RD,NW	5042	807	435-C
13TH ST AND KENNEDY ST,NW	5043	808	928-A
13TH ST AND KENYON ST,NW	5044	809	926-A
13TH ST AND MISSOURI AVE,NW	5045	810	707-D
13TH ST AND MONROE ST,NW	5046	811	801-B
13TH ST AND PARK RD,NW	5047	812	815-B
13TH ST AND PEABODY ST,NW	5048	813	1416
13TH ST AND ROOSEVELT H S ENT,NW	5049	814	400-A
13TH ST AND UPSHUR ST,NW	5050	815	927-A
13TH ST AND V ST,NW	5051	816	921-E
13TH ST AND W ST,NW	5052	817	922-C
14TH ST & ARKANSAS AVE & VARNUM ST,NW	5053	818	383-D
14TH ST AND CLIFTON ST,NW	5054	819	763-B
14TH ST AND COLUMBIA RD,NW	5055	820	731-H
14TH ST AND DECATUR ST,NW	5056	821	1046
14TH ST AND EUCLID ST,NW	5057	822	720-B
14TH ST AND FAIRMONT ST,NW	5058	823	1323
14TH ST AND FLORIDA AVE,NW	5059	824	890-B
14TH ST AND GALLATIN ST,NW	5060	825	1480-A
14TH ST AND GIRARD ST,NW	5061	826	405-B
14TH ST AND HARVARD ST,NW	5062	827	438-I
14TH ST AND IRVING ST,NW	5063	828	433-H

14TH ST AND KALMIA RD,NW	5064	829	1246-B
14TH ST & KENNEDY ST & COLORADO AVE,NW	5065	830	235-F
16TH ST AND FULLER ST, NW	5066	1473	1300-A
14TH ST AND KENYON ST,NW	5066	831	459-B
14TH ST AND KENYON ST & PARK RD,NW	5067	832	437-M
14TH ST AND MERIDIAN PL,NW	5068	833	1204
14TH ST AND MISSOURI AVE,NW	5069	834	1092-C
14TH ST AND MONROE ST,NW	5070	835	1094-A
14TH ST AND SPRING RD,NW	5071	836	1093-A
14TH ST AND UPSHUR ST,NW	5072	837	1091-B
14TH ST AND V ST,NW	5073	838	888-C
14TH ST AND W ST,NW	5074	839	889-B
15TH ST AND 16TH ST & IRVING ST,NW	5075	840	210-K
15TH ST AND COLUMBIA RD,NW	5076	841	1028
15TH ST AND EUCLID ST,NW	5077	842	1026
15TH ST AND HARVARD ST,NW	5078	843	1027-A
15TH ST & N HAMP AVE & FLA AVE & W ST,NW	5079	844	130-F
15TH ST AND V ST,NW	5080	845	1025-B
16TH ST AND ALASKA AVE,NW	5081	846	TS-220-E
16TH ST AND ALLISON ST,NW	5082	847	896-D
16TH ST AND ARKANSAS AVE,SHEPHERD ST,NW	5083	848	307-E
16TH ST AND ASPEN ST & SHERRIL DR,NW	5084	849	911-D
16TH ST AND COLORADO AVE,NW	5085	850	328-D
16TH ST AND CRESCENT PL,NW	5086	851	1272
16TH ST AND DECATUR ST,NW	5087	852	897-C
16TH ST AND EUCLID ST,NW	5088	853	898-B
16TH ST AND FLORIDA AVE & W ST,NW	5089	854	567-B
16TH ST AND FORT STEVENS DR,NW	5090	855	1271
16TH ST & HARVARD ST & COLUMBIA RD,NW	5091	856	111-D
16TH ST & HARVARD ST & MT PLEASANT ST,NW	5092	857	581-F
16TH ST AND HOLLY ST,NW	5093	858	912-E
16TH ST AND KALMIA RD,NW	5094	859	586-I
16TH ST AND KENNEDY ST & MORROW DR,NW	5095	860	550-E
16TH ST AND LAMONT ST,NW	5096	861	899-B
16TH ST AND MISSOURI AVE,NW	5097	862	453-1A
16TH ST AND MONROE ST,NW	5098	863	577-B
16TH ST AND NEWTON ST,NW	5099	864	956-A
16TH ST AND OAK ST,NW	5100	865	909-A
16TH ST AND PARK RD & PINE ST,NW	5101	866	201-E
16TH ST AND PORTAL DR,NW	5102	867	551-G
16TH ST AND SHERIDAN ST,NW	5103	868	910-A
16TH ST AND SPRING RD,NW	5104	869	396-A
16TH ST AND UPSHUR ST,NW	5105	870	670-D
16TH ST AND V ST,NW	5106	871	908-A
16TH ST AND VAN BUREN ST,NW	5107	872	1412-A
16TH ST AND WALTER REED ENT,NW	5108	873	424-D
17TH ST & MT PLEASANT ST & PARK RD,NW	5109	874	32-H

ARKANSAS AVE AND ALLISON ST,NW	5110	875	1317
ARKANSAS AVE AND UPSHUR ST,NW	5111	876	1090-A
BLAIR RD AND ASPEN ST,NW	5112	877	1139-A
BLAIR RD AND VAN BUREN ST,NW	5113	878	1206-A
CARROL ST AND CEDAR ST,NW	5114	879	541-D
CARROLL ST AND MAPLE ST,NW	5115	880	1347
CARROLL ST & WILLOW ST & EASTERN AVE,NW	5116	881	502-M
GEORGIA AVE & ALASKA AVE & KALMIA RD,NW	5117	882	114-I
GEORGIA AVE AND BRYANT ST,NW	5118	883	708-G
GEORGIA AVE AND BUCHANAN ST,NW	5119	884	1059-B
GEORGIA AVE & BUTTERNUT ST & W R HOSP,NW	5120	885	843-C
GEORGIA AVE & COLUMBIA RD & HOBART PL,NW	5121	886	66-H
GEORGIA AVE AND DAHLIA ST,NW	5122	887	1289-C
GEORGIA AVE AND DECATUR ST,NW	5123	888	1052-B
GEORGIA AVE & EASTERN AVE & BLAIR RD,NW	5124	889	599-I
GEORGIA AVE AND ELDER ST,NW	5125	890	1464-B
GEORGIA AVE AND EUCLID ST,NW	5126	891	745-B
GEORGIA AVE AND FAIRMONT ST,NW	5127	892	1146-E
GEORGIA AVE. & GALLATIN ST & ARKANSAS,NW	5128	893	409-F
GEORGIA AVE AND GERANIUM ST,NW	5129	894	844-C
GEORGIA AVE AND HARVARD ST,NW	5130	895	840-D
GEORGIA AVE AND HOWARD PL,NW	5131	896	1033-A
GEORGIA AVE AND INGRAHAM ST,NW	5132	897	1225-A
GEORGIA AVE AND IRVING ST,NW	5133	898	158-G
GEORGIA,KANSAS AVE & UPSHUR, 9TH ST,NW	5134	899	365-I
GEORGIA AVE AND KENNEDY ST,NW	5135	900	753-D
GEORGIA AVE AND KENYON ST,NW	5136	901	419-B
GEORGIA AVE AND MADISON ST,NW	5137	902	1255-B
GEORGIA AVE AND MISSOURI AVE,NW	5138	903	57-Q
GEORGIA,N HAMP AVE & ROCK CR CH RD,NW	5139	904	204-F
GEORGIA AVE AND PARK RD,NW	5140	905	208-E
GEORGIA AVE AND PEABODY ST,NW	5141	906	1287-A
GEORGIA AVE AND PINEY BRANCH RD,NW	5142	907	195 E
GEORGIA AVE AND PRINCETON PL,NW	5143	908	463-H
GEORGIA AVE AND RANDOLPH ST,NW	5144	909	841-C
GEORGIA AVE AND RITTENHOUSE ST,NW	5145	910	842-B
GEORGIA AVE AND V ST,NW	5146	911	1222-B
GEORGIA AVE AND VAN BUREN ST,NW	5147	912	714-A
GEORGIA AVE AND W ST,NW	5148	913	1346-E
ILLINOIS AVE AND KENNEDY ST,NW	5149	914	431-B
IRVING ST AND MT PLEASANT ST,NW	5150	915	427
IRVING ST AND EAST-WEST CROSSING,NW	5151	916	426-B
BLAIR RD KANSAS AV.PEABDY ST & N DAK AVE	5152	917	1616-A
KANSAS AVE & MISSOURI AVE & KENNEDY, NW	5153	918	249-E
MICHIGAN AVE AND CHILDRENS HOSPITAL,NW	5154	919	1411-B
NEW HAMPSHIRE AVE & FARRAGUT, 2 ST,NW	5155	920	673
NEW HAMPSHIRE AVE AND MISSOURI AVE,NW	5156	921	481-F

NEW HAMPSHIRE AVE & SHEPHERD ST, 7 ST,NW	5157	922	455-E
NEW HAMPSHIRE AVE AND UPSHUR ST,NW	5158	923	1134-A
NEW HAMPSHIRE AVE AND WEBSTER ST,NW	5159	924	1137-A
PARK PL AND KENYON ST,NW	5160	925	1122-B
PARK PL AND IRVING ST,NW	5161	926	485-C
PINEY BRANCH RD AND BLAIR RD,NW	5162	927	743-F
PINEY BRANCH RD AND BUTTERNUT ST,NW	5163	928	468-B
PINEY BRANCH RD AND EASTERN AVE,NW	5164	929	1492-B
PINEY BRANCH RD AND VAN BUREN ST,NW	5165	930	1458
ROCK CREEK CHURCH RD AND UPSHUR ST,NW	5166	931	188-D
SHERMAN AVE AND BARRY PL,NW	5167	932	449
SHERMAN AVE AND COLUMBIA RD,NW	5168	933	604-B
SHERMAN AVE AND EUCLID ST,NW	5169	934	878-D
SHERMAN AVE AND FAIRMONT ST,NW	5170	935	1263
SHERMAN AVE AND FLORIDA AVE,NW	5171	936	593-A
SHERMAN AVE AND HARVARD ST,NW	5172	937	445-A
SHERMAN AVE AND IRVING ST,NW	5173	938	447-A
SHERMAN AVE AND KENYON ST,NW	5174	939	605
SHERMAN,N HAMP AVE,PARK RD.& MONROE, NW	5175	940	62-F
WARDER ST AND COLUMBIA RD,NW	5176	941	414-B
WARDER ST AND HOBART PL,NW	5177	942	425-C
WARDER ST AND IRVING ST,NW	5178	943	484-B
WARDER ST AND KENYON ST,NW	5179	944	1123-A
WARDER ST AND OTIS PL,NW	5180	945	1045-A
EASTERN AVE, CHILLUM RD, RITTENHOUSE,NE	5181	947	1296-A
HAWAII AVE & ALLISON ST & CLERMONT DR,NE	5182	951	214-E
NEW HAMPSHIRE AVE AND EASTERN AVE,NE	5183	958	1114-E
NEW HAMPSHIRE AVE AND PEABODY ST,NE	5184	959	1152-B
NEW HAMP AVE & RITTENHOUSE, & 3RD ST,NE	5185	960	549-H
RIGGS RD AND 1ST PL,NE	5186	961	1486-B
RIGGS RD AND BLAIR RD & FT TOTTEN DR,NE	5188	963	957-H
RIGGS RD AND CHILLUM PL,NE	5189	964	1325
RIGGS RD AND EASTERN AVE,NE	5190	965	1031-B
RIGGS RD AND NICHOLSON ST & 6TH ST,NE	5191	966	1280
RIGGS RD AND S DAKOTA AVE,NE	5192	967	276-G
N CAPITOL ST AND BRYANT ST	5193	969	495-F
N CAPITOL ST AND CHANNING ST	5194	970	1484-E
N CAPITOL ST AND GALLATIN ST	5195	971	713-E
N CAPITOL,FORT DR,HAREWOOD,CLERMONT DR	5196	972	494-M
N CAPITOL,HAWAII,BUCHANAN,ROCK CR CHURCH	5197	973	215-M
N CAPITOL ST AND KANSAS AVE & CHILLUM PL	5198	974	1279-B
N CAPITOL ST AND MICHIGAN AVE	5199	975	67-N
N CAPITOL ST & MISSOURI AV & RIGGS RD	5200	976	240-H
N CAPITOL ST & N HAMP AV & KENNEDY ST	5201	977	140-F
FLORIDA AVE AND VERMONT AVE & V ST ,NW	5202	981	107-C
16TH ST AND MONTAGUE ST,NW	5203	980	1516-B
ROCK CREEK CHURCH RD & ALLISON ST. NW	5204	1457	1678

TAYLOR ST AND HAREWOOD RD,NE	5205	968	387-D
RIGGS ROAD & NICHOLSON STREET(SOUTH), NE	5206	979	1632-A
BLAIR ROAD NORTH DAKOTA AV. & PEABODY ST	5207	1398	1615
IRVING ST AND RAMP FROM SB N. CAPITOL	5208	1454	1677
9TH STREET AND MISSOURI AVE, NW	5232	1315	1716
MICHIGAN AVE AND FRANKLIN ST,NE	5233	954	309-C
PINEY BRANCH RD AND CEDAR ST, NW	5236	978	1525
GEORGIA AVE AND ASPEN ST, NW	5237	1302	1290-A
16TH ST AND NORTH PORTAL DR, NW	5238	1307	1566
16TH STREET AND MISSOURI AVE NW (NORTH)	5239	1341	453-2A
ROCK CREEK CHURCH RD AND HAREWOOD RD, NW	5240	1305	1545-B
NEW HAMPSHIRE AVE AND BLAIR RD, NE	5241	1314	1614
14TH ST AND BUCHANAN ST,NW	5242	1427	1681
13TH ST AND OTIS PLACE,NW	5243	1322	1560
TAYLOR STREET AND HAWAII AVE NE	5244	1360	1578
18TH ST AND PARK RD NW	5245	1359	1581-A
GEORGIA AVE AND BARRY PL, NW	5246	1361	1574-B
PINEY BRANCH R0AD AND ASPEN ST, NW	5247	1363	1592
ILLINOIS AVE AND INGRAHAM ST,NW	5248	1441	1711
ARKANSAS AVE AND PINEY BRANCH PKWY NW	5249	1384	1599-A
NEW HAMPSHIRE AVE. AND GALLATIN ST.,NW	5250	1371	1569
13TH ST & ALLISON ST, NW	5251	1415	1653-B
2ND ST AND MISSOURI AVE,NW	5252	1428	1661
14TH ST AND TAYLOR ST,NW	5252	1431	
GEORGIA AVE AND ALLISON ST,NW	5253	1435	
13TH AND TAYLOR NW	5254	1438	
16TH LANE CONTROLS NORTH OF WALTER REED	5254	1421	1650-B
NEW HAMP.,SPRING RD, AND PRINCETON NW	5254	1453	1722
NEW HAMPSHIRE AVE BRIDGE LANE CONTROL	5255	1460	1676
18TH ST AND COLUMBIA RD, NW	6001	1122	45-J
TILDEN ST AND BEACH DR AND PARK RD, NW	6002	1244	1138-B
24TH ST AND CALVERT ST, NW	6003	1124	784-H
24TH ST AND CONNECTICUT AVE, NW	6004	1125	1497-A
24TH ST AND MASSACHUSETTS AVE, NW	6005	1126	1154-B
27TH ST AND MILITARY RD, NW	6006	1127	521-C
28TH ST AND P ST, NW	6007	1128	1101
28TH ST AND PENNSYLVANIA AVE AND M ST,NW	6008	1129	1209-F
29TH ST AND CALVERT AND CLEVELAND, NW	6010	1131	554-H
29TH ST AND M ST AND PENNSYLVANIA AVE,NW	6011	1132	91-R
30TH ST AND M ST, NW	6012	1133	1086-F
30TH ST & MASS, WHITEHAVEN, ROCKCREEK,NW	6013	1134	978-C
30TH ST AND P ST, NW	6014	1135	1100
31ST ST AND M ST, NW	6016	1137	1051-C
31ST ST AND MILITARY RD, NW	6017	1138	564-F
32ND ST & CLEVELAND AVE & GARFIELD ST,NW	6018	1139	678-C
32ND ST AND MILITARY RD, NW	6019	1140	1085-B
33RD ST AND M ST, NW	6020	1141	75-J

33RD ST AND Q ST, NW	6021	1142	677-A
34TH ST AND CLEVELAND AVE, NW	6022	1143	341-F
34TH ST AND GARFIELD ST, NW	6023	1144	975-C
34TH ST AND M ST, NW	6024	1145	54-Q
34TH ST AND MACOMB ST, NW	6025	1146	465-A
34TH ST AND MASSACHUSETTS AVE, NW	6026	1147	165-J
34TH ST AND PORTER ST, NW	6027	1148	851-C
34TH ST AND Q ST, NW	6028	1149	772-B
34TH ST AND RESERVOIR RD, NW	6029	1150	1223-A
34TH ST AND WISCONSIN AVE, NW	6030	1151	816-E
34TH ST AND WOODLEY RD, NW	6031	1152	464-B
35TH ST AND RESERVOIR RD, NW	6032	1153	89-E
36TH ST, M ST, CANAL RD.& W.HURST FW.NW	6033	1154	149-L
38TH ST AND RESERVOIR RD, NW	6034	1155	1153-C
39TH ST AND CATHEDRAL AVE, NW	6035	1156	1459-D
39TH ST AND MASS AVE AND IDAHO AVE, NW	6036	1157	933-C
39TH ST AND NEBRASKA & ALBERMARLE, NW	6037	1158	390-C
39TH ST AND RESERVOIR RD, NW	6038	1159	1514-B
41ST ST AND LIVINGSTON ST, NW	6039	1160	1399-A
41ST ST AND MILITARY RD AND RENO RD, NW	6040	1161	348-E
41ST & MCKINLEY, WESTERN, CEDAR PKWY, NW	6041	1162	286-D
42ND ST AND ALBERMARLE ST, NW	6042	1163	1231-A
42ND ST AND RIVER RD, NW	6043	1164	804
43RD ST AND RIVER RD & CHESAPEAKE ST, NW	6044	1165	1418
44TH ST & MCARTHUR BLVD & FOXHALL RD, NW	6045	1166	282-H
44TH ST AND WESTERN AVE, NW	6046	1167	637-D
46TH ST AND MASS AVE AND TILDEN ST, NW	6047	1168	954-A
46TH ST AND RIVER RD & GARRISON ST, NW	6048	1169	1371-A
46TH ST AND VAN NESS ST, NW	6049	1170	1273
46TH ST AND YUMA ST, NW	6050	1171	728
49TH ST AND MASSACHUSETTS AVE.,NW	6051	1172	1125-D
ADAMS MILL RD AND CALVERT AND LANIER, NW	6052	1173	391-C
ADAMS MILL RD & HARVARD ST & ZOO ENT, NW	6053	1174	1192-B
ADAMS MILL RD & KENYON ST & IRVING ST,NW	6054	1175	392-E
CALVERT ST AND SHOREHAM HOTEL, NW	6055	1177	1081-D
CALVERT ST AND TUNLAW RD, NW	6056	1178	852-TEMP
CANAL RD AND ARIZONA AVE, NW	6057	1179	376-O
CANAL RD AND CHAIN BRIDGE, NW	6058	1180	1243-F
CANAL RD AND FOXHALL RD, NW	6059	1181	417-I
COLUMBIA RD AND KALORAMA RD, NW	6060	1182	742-F
COLUMBIA RD AND ONTARIO RD, NW	6061	1183	709
CONNECTICUT AVE AND ALBERMARLE ST, NW	6062	1184	779-C
CONNECTICUT AVE AND BRANDYWINE ST, NW	6063	1185	778-C
CONNECTICUT AVE AND CALVERT ST, NW	6064	1186	28-S
CONNECTICUT AVE AND CATHEDRAL AVE, NW	6065	1187	242-I
CONNECTICUT AVE AND DAVENPORT ST, NW	6066	1188	777-C
CONNECTICUT AVE AND DEVONSHIRE PL, NW	6067	1189	298-D

CONN AVE & FESSENDEN & #31 ENGINE HSE,NW	6068	1190	377-C
CONNECTICUT AVE AND HUNTINGTON ST, NW	6069	1191	1360-B
CONNECTICUT AVE AND JENIFER ST, NW	6070	1192	1056
CONNECTICUT AVE AND LIVINGSTON ST, NW	6071	1193	667-C
CONNECTICUT AVE AND MACOMB ST, NW	6072	1194	782-C
CONNECTICUT AVE AND MCKINLEY ST, NW	6073	1195	775-B
CONNECTICUT AVE AND MILITARY ST, NW	6074	1196	776-G
CONNECTICUT AVE AND NEBRASKA AVE, NW	6075	1197	421-L
CONNECTICUT AVE AND OLIVER ST, NW	6076	1198	80-E
CONNECTICUT AVE AND ORDWAY ST, NW	6077	1199	385-H
33RD, RESERVOIR RD AND WISCONSIN AVE, NW	6078	1465	1697-A
CONNECTICUT AVE AND PORTER, NW	6079	1200	132-Q
CONNECTICUT AVE AND SEDGEWICK ST, NW	6080	1201	781-B
CONNECTICUT AVE AND TILDEN ST, NW	6081	1202	780-D
CONNECTICUT AVE AND VAN NESS ST, NW	6082	1203	715-L
CONNECTICUT AVE AND VEAZEY TERRACE, NW	6083	1204	1043-J
CONNECTICUT AVE AND WOODLEY RD, NW	6084	1205	29-I
CONNECTICUT AVE AND YUMA ST, NW	6085	1206	330-H
CONNECTICUT AVE AND WINDOM, NW	6086	1207	1513-A
CONN AVE AND ZOO ENT AND JEWETT ST,NW	6087	1208	433-F
CONNECTICUT AVE AND ZOO GATE, NW	6088	1209	138-E
FOXHALL RD AND GARFIELD ST, NW	6089	1211	1264
FOXHALL RD AND Q ST, NW	6090	1212	257-B
FOXHALL RD AND RESERVOIR RD, NW	6091	1213	1080-F
KEY BRIDGE AND M ST, NW	6092	1214	53-L
LOUGHBORO RD AND SIBLEY HOSPITAL ENT, NW	6093	1215	1433
MACARTHUR BLVD AND ARIZONA AVE, NW	6094	1216	255-D
MACARTHUR BLVD AND CATHEDRAL AVE, NW	6095	1217	1422
MACARTHUR BLVD AND DANA PL, NW	6096	1218	1179-B
MACARTHUR BLVD AND LOUGHBORO RD, NW	6097	1219	1133-C
MACARTHUR BLVD AND Q ST, NW	6098	1220	1201-E
MACARTHUR BLVD AND RESERVOIR RD (EAST)NW	6099	1221	1047-D
MACARTHUR BLVD AND RESERVOIR RD (WEST)NW	6100	1222	1150-A
MACARTHUR BLVD AND V ST, NW	6101	1223	1177-B
MASSACHUSETTS AVE AND CATHEDRAL AVE, NW	6102	1410	1636-A
MASS AVE & DRIVEWAY AT 4201 MASS AVE, NW	6103	1224	522-A-TP
MASS AVE AND GLOVER GATE (AU), NW	6104	1225	980-E
MASS AVE AND BELMONT RD, NW	6105	1226	1611-B
MASS AVE AND CALIFORNIA ST, NW	6106	1227	305-B
MASS AVE AND GARFIELD ST, NW	6107	1228	623-B
MASS AVE AND GILLISS, OBSERVATORY CIR,NW	6108	1229	1055-D
MASS AVE AND WATERSIDE DR, NW	6109	1230	1610-B
MILITARY RD AND NEVADA AVE, NW	6110	1231	1140-B
MILITARY RD AND OREGON & GLOVER, NW	6111	1232	647-C
NEBRASKA AVE AND FESSENDEN ST, NW	6112	1233	1374
NEBRASKA AVE AND FOXHALL RD, NW	6113	1234	375-E
NEB AVE AND MILITARY & BROAD BRANCH, NW	6114	1235	226-G

NEBRASKA AVE AND NEVADA AVE, NW	6115	1236	1008-A
NEBRASKA AVE & NEWARK, & ROCKWOOD PWY,NW	6116	1237	845-A
NEBRASKA AVE AND NEW MEXICO AVE, NW	6117	1238	729-C
NEBRASKA AVE AND RENO RD, NW	6118	1239	706-C-3
NEBRASKA AVE AND VAN NESS ST, NW	6119	1241	1103
NEW MEXICO AVE AND CATHEDRAL AVE, NW	6120	1242	460-E
NEW MEXICO AVE AND MACOMB ST, NW	6121	1243	1463-A
RENO RD AND ALBERMARLE ST, NW	6122	1246	974-B
RENO RD AND FESSENDEN ST, NW	6123	1247	942-B
RENO RD AND TILDEN ST & SPRINGLAND LN,NW	6124	1248	546-G
RENO RD AND VAN NESS ST, NW	6125	1249	722-D
WESTERN AVE AND GEICO ENTRANCE, NW	6126	1250	636-A
WESTERN AVE AND JENIFER ST, NW	6127	1251	635-E
WESTERN AVE AND RIVER RD, NW	6128	1253	598-E
WESTERN AVE AND WISCONSIN AVENUE, NW	6129	1254	1572-E
WISCONSIN & ALBERMARLE & SEARS CROSNG,NW	6130	1255	393-M
WISCONSIN AVE AND BRANDYWINE ST, NW	6131	1256	568-E
WISCONSIN AVE AND CALVERT ST & 37 ST, NW	6132	1257	289-K
WISCONSIN AVE AND DAVENPORT ST, NW	6133	1258	1352
WISCONSIN AVE AND DUMBARTON ST & O ST,NW	6134	1259	538-H
WISCONSIN AVE AND EDMUNDS ST, NW	6135	1260	227-D
WISCONSIN AVE AND FESSENDEN ST, NW	6136	1261	748-B
WISC AVE & FRIENDSHIP PO (3900 WISC), NW	6137	1262	759-D
WISCONSIN AVE AND GARFIELD ST, NW	6138	1263	167-F
WISCONSIN AVE AND HALL PL, NW	6139	1264	1084-A
WISCONSIN AVE AND HARRISON ST, NW	6140	1265	679-A
WISCONSIN AVE AND JENIFER ST, NW	6141	1266	669-F
WISCONSIN AVE AND M ST, NW	6142	1267	52-L
WISCONSIN AVE AND MACOMB ST, NW	6143	1268	756-D
WISCONSIN AVE AND MASSACHUSETTS AVE , NW	6144	1269	17
WISCONSIN AVE AND N ST, NW	6145	1270	1169-B
WISCONSIN AVE AND NEWARK ST, NW	6146	1271	757-C
WISCONSIN AVE AND P ST, NW	6147	1272	95-C
WISCONSIN AVE AND PORTER ST, NW	6148	1273	758-C
WISCONSIN AVE AND Q ST, NW	6149	1274	207-D
WISCONSIN AVE AND R ST, NW	6150	1275	761-E
WISCONSIN AVE AND RODMAN ST, NW	6151	1276	402-D
WISCONSIN AVE AND VAN NESS ST, NW	6152	1277	751-B
WISCONSIN AVE AND W PL, NW	6153	1278	176-A
WISC AVE & WHITEHAVEN ST, WHTHVEN PWY,NW	6154	1279	588-D
WISCONSIN AVE AND WOODLEY RD, NW	6155	1280	754-C
TENLEY CIRCLE, NW (EAST SIDE)	6156	1281	749-H.1
WARD CIRCLE, NW	6157	1282	187-D
WISCONSIN AVE. AND PROSPECT STREET,NW	6158	1393	1619-D
WISCONSIN AVE. ELLICOTT ST. & 42ND ST,NW	6159	1394	1617
CANAL RD & GEORGETOWN UNIVERSITY ENT. NW	6160	1411	1654
M ST AND THOMAS JEFFERSON ST, NW	6161	1425	1691

PORTER ST PED BET 34TH AND CONN.,NW	6162	1420	1669
FOXHALL AND THE FIELD SCHOOL DRIVEWAY NW	6163	1423	1667
FOXHALL RD & WHITEHAVEN PKWY, NW	6164	1426	1665-A
34TH ST AND WISCONSIN AVE, NW	6165	1472	
ADAMS MILL RD AND KLINGLE & ROSEMONT, NW	6203	1176	416-L
PARK RD AND WALBRIDGE, NW	6205	1245	432-F
NEBRASKA AVE AND CHESAPEAKE ST,NW	6206	1422	1674
NEBRASKA AVE AND CHESAPEAKE ST,NW	6206	1422	1674
NEBRASKA AVE AND UTAH AVE, NW	6234	1240	1354
WESTERN AVE AND OLIVER ST, NW	6235	1252	759-C
CALVERT ST AND BILTMORE ST, NW	6236	1283	1535-B
WESTERN AVE AND LISNER HOME ENT, NW	6237	1287	1521-D
M ST, POTOMAC ST, AND MARKET PL, NW	6238	1289	1292-D
WESTERN AVE AND WISCONSIN CIRCLE, NW	6239	1290	1528-D
34TH ST AND LOWELL ST, NW	6240	1291	1530-A
37TH ST AND RESERVOIR RD, NW	6241	1334	1564
48TH ST, FORDHAM RD, AND MASS AVE, NW	6242	1293	1531-B
39TH ST AND MILITARY RD, NW	6243	1298	1623
NEW MEXICO AVE AND NEWARK ST, NW	6244	1303	1542
PORTER & QUEBEC, NW	6245	1419	1670-A
WISCONSIN AVE AND UPTON ST, NW	6246	1310	1565-C
WISCONSIN AVE. AND S STREET,NW	6249	1446	1672-A
30TH ST AND MILITARY RD, NW	6250	1324	1554-B
NEB AVE DAVENPORT ST & FORT DR NW	6251	1346	1576
WESTERN AVENUE AND MILITARY ROAD, N.W.	6252	1353	1573-A
50TH STREET AND MASSACHUSETTS AVE.,NW	6253	1365	1577-B
2323 WISCONSIN AVE.,NW	6254	1387	1630-B
CONNECTICUT AVE BRIDGE OVER KLINGLE	6255	1484	1749
3RD ST & PENN AVE & INDEP AVE, SE	7008	696	343-F
7TH ST & 8TH ST & INDEP AV & NC AVE, SE	7021	709	353-C.2
14TH ST AND THOMAS CIRCLE, NW	7027	199	69E.2
14TH ST, 15TH ST, MASS,INDEP & SC AV, SE	7046	734	364-D
16TH ST AND SCOTT CIRCLE, NW	7059	231	81-G
6TH ST AND C ST & MASS AV & MD AV, NE	7069	540	318-D
18TH ST AND U ST,VERNON ST, FLA AVE, NW	7101	273	59-H
18TH ST,Q ST AND NEW HAMPSHIRE AVE, NW	7109	271	125.2A
GEORGIA,KANSAS AVE & UPSHUR, 9TH ST,NW	7134	899	365-I
13TH ST AND H ST AND NEW YORK AVE, NW	7135	167	164-N
TENLEY CIRCLE, NW (WEST SIDE)	7156	1281	749-H.2
LOGAN CIRCLE, NW - WEST (SUBUNIT 1)	7157	382	58L.3
LOGAN CIRCLE, NW - SOUTH (SUBUNIT 2)	7158	382	58-L.2
MICH AVE AND 13TH ST AND TAYLOR ST, NE	7161	632	178-L
NEW YORK AVE & MONTANA AV & W VA AVE, NE	7185	657	49.2
DUPONT CIRCLE, NW (SUBUNIT 1)	7195	381	108-E
DUPONT CIRCLE, NW (SUBUNIT 2)	7196	381	108-E
N CAPITOL ST & N HAMP AV & KENNEDY ST	7201	977	140-F
TEST CTRLR 9918-ACTUATED	9918	9918	1166

TEST CONTROLLER 9919	9919	9919	9919
TEST CTRLR ALABAMA AVE/STANTON & 21ST.SE	9920	9920	1185

TECHNICAL SPECIFICATION
Light Emitting Diode (LED) Traffic Signal Modules

1. The purpose of this is to describe the minimum acceptable design and operating requirements for 12 inch (300 mm) Light Emitting Diode (LED) vehicle signal modules. The specific items covered under this specification include the red ball, the yellow ball, the green ball, the red arrow, the yellow arrow, and the green arrow.

2. GENERAL DESCRIPTION

   2.1 This specification covers "red ball", "yellow ball", "green ball", "red arrow", "yellow arrow" and "green arrow" LED modules to be used in place of the incandescent lamp, reflector, socket, gasket and lens assembly of the vehicle signal sections. Each LED module shall consist of an assembly that utilizes LEDs as the light source in lieu of an incandescent lamp for use in vehicle signal sections.

   2.2 All vehicle signal LED modules shall be engineered to fit into all ITE compliant conventional vehicle signal housings. They shall fit in the conventional polycarbonate vehicle signal head houseing, as used in the District of Columbia, and as described in detail in an accompanying technical specification.

   2.3 The LEDs utilized in the modules shall be AlInGap technology for red and yellow indications or InGaN for green indications. The LED's shall be the ultrabright type rated for 100,000 hours of continuous operation form -40° C to +74° C.

   2.4 Each LED module shall be rated for a minimum useful life of 48 months. All LED modules shall meet all parameters of this specification during this period.

   2.5 Each individual LED module shall be wired such that a catastrophic loss or the failure of one LED will result in the loss of not more than 5% of the signal module light output.

   2.6 Each "red ball" and "green ball" module shall be in full compliance of all provisions of the July, 1998 Institute of Transportation Engineers Interim LED Purchase Specification, Vehicle Traffic Control Signal Heads, Part 2.

3. ELECTRICAL REQUIREMENTS

   3.1 Power Consumption

      3.1.1 The maximum power consumption requirements measured in watts for each module are as follows:

MODULE	25°C	74°C
Red Ball	11.0W	17.0W
Yellow Ball	22.0W	25.0W

MODULE	25°C	74°C
Green Ball	15.0W	15.0W
Red Arrow	9.0W	12.0W
Yellow Arrow	10.0W	12.0W
Green Arrow	11.0W	11.0W

3.1.2 All LED Modules except the yellow ball shall be U.S. EPA Energy Star compliant at 25°C. Power consumption of these LED Modules shall not exceed that maximum allowed by the EPA.

3.2 Operating Voltage

3.2.1 Each module shall operate from a 60HZ±3HZ AC line over a voltage ranging from 95 volts to 135 volts. Fluctuations of line voltage shall have no visible effect upon the luminous intensity of the indications.

3.2.2 The operating voltage of the modules shall be 120 Volts AC. All operating parameters shall be measured at this voltage.

3.2.3 LED circuitry shall prevent perceptible flicker to the unaided eye over the 95 to 135 voltage range.

3.3 The LED module shall have a power factor of 0.90 or greater at a nominal rated voltage at 25° C after 60 minutes of operation.

3.4 Total harmonic distortion (current and voltage) induced into an AC power line by an LED signal shall not exceed 20 percent at the rated voltage at 25° C.

3.5 The signal module on-board circuitry shall include voltage surge protection to withstand high-repetition noise transients as stated in Section 2.1.6 of the NEMA Standard TS-2 dated 1992.

3.6 Each LED module and associated on-board circuitry shall be in compliance with Federal Communications Commission (FCC) noise regulations and must meet FCC Title 47, Subpart B, Section 15 regulations concerning the emission of electronic noise.

3.7 All wiring and terminal blocks must meet the requirements of Section 13.02 of the ITE Publication: Equipment and Material Standards, Chapter 2, Vehicle Traffic Control Signal Heads.

3.8 Each LED module shall be operationally compatible with controller assemblies and peripheral equipment including sold state load switches; flashers, and conflict monitors currently used in the District of Columbia. Current controller specifications are available for review at the specific request of the contractor or vendor.

3.8.1 When a current of 20 mA AC or less is applied to the unit, the voltage read across the two leads shall be 15 VAC or less.

3.9 Each LED module shall feature control circuitry to prevent current flow through the LED module in the off state to avoid any false indication as may be perceived by the human eye during the daylight and evening hours.

3.10 Two secured, color coded, 600 V, 16 AWG minimum jacketed wires conforming to the National Electrical Code, rated for service at + 105° C, are to be provided for electrical connections for each LED signal module.

Section 5.5 of these specifications includes more detail relevant to these conductors.

3.11 Transient voltage suppression rated at 1500 watts for 1 millisecond and fusing with a maximum rating of 2 amps shall be provided to minimize the effect and repair cost of an extreme over-voltage situation of other failure mode.

4. ENVIRONMENTAL REQUIREMENTS

4.1 Each LED module shall be rated for use in operating temperatures in the range of -40° C (-40° F) to +74° (+165° F). Each LED module shall meet all specifications throughout this temperature range.

4.2 Each LED module shall be protected against dust and moisture intrusion in conformance with NEMA Moisture Resistant Standard 250-1991 for Type 4 enclosures to protect all internal components.

5. CONSTRUCTION

5.1 Each LED module shall be a single, self-contained sealed unit, not requiring on-site assembly for installation into an existing traffic signal housing.

5.2 The power supply for the LED module shall be integral to the unit.

5.3 The circuit board and the power supply shall be contained inside the module.

5.4 Each LED module shall incorporate a printed circuit board containing all required LED's and circuit components. The LED's shall be mounted and soldered to the printed circuit board.

5.5 Each LED module shall feature two 39 inch long 20 AWG wire leads with strain relief and spade terminals for connection to the terminal block of the signal head. One of the conductors shall contain white insulation to signify neutral. The color of the other conductor shall be different and shall be used to differentiate between the red ball, yellow ball, green ball, red arrow, yellow arrow and green arrow LED module. Conductor colors shall be unique and different for those used for pedestrian signal indications also.

5.6 Each LED module shall feature a rigid housing for protection in shipping, handling, and installation, and a one-piece neoprene gasket. Screw-in type products are expressly prohibited for LED modules.

5.7 The assembly and manufacturing process for the LED signal assembly shall be designed to ensure that all internal components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.

5.8 Each LED module shall be watertight when properly installed in a traffic-signal housing. Each LED module shall utilize the same mounting hardware used to secure the incandescent lens and gasket assembly, and

shall only require a screwdriver or a standard installation tool to complete the mounting.

5.9 Each LED module shall weigh less than 5 pounds.

5.10 Each LED module shall be designed to be installed in the doorframe of a standard traffic signal housing. Each LED module shall be capable of being sealed in the doorframe with a one piece EPDM (ethylene, propylene rubber) gasket.

5.11 Each LED module shall be weatherproof after installation and connection.

6. MATERIALS

6.1 Materials used for the lens and signal module shall conform to the appropriate ASTM specifications for the materials.

6.2 Enclosures containing either the power supply or electronic components of the signal module shall be made of UL94VO flame retardant materials. The module lens does not need to conform with this requirement.

6.3 The lens of the LED module shall be integral to the unit, shall be convex with a smooth outer surface and shall be made ultraviolet stabilized plastic material.

6.4 Each LED module lens shall be capable of withstanding ultraviolet (direct sunlight) exposure for a minimum period of 5 years without exhibiting evidence of deterioration.

6.5 A surface coating or chemical surface treatment shall be applied to each outer polymetric lens to provide front surface abrasion resistance.

6.6 Each LED module shall incorporate an inner Frensel lens sealed to the lamp housing to collimate the light emitted by the LED engine. The outer lens shall focus the collimated light to meet ITE intensity and distribution standards.

6.7 Each LED module shall almost perfectly approximate to the motorist the appearance of a 12 inch standard incandescent signal. The surface of the LED module shall appear to the motorist to be nearly totally uniform in illumination, and have a wide viewing angle making it suitable for installation on wide boulevards.

6.8 The external lens surface for all LED modules shall be smooth with no raised surfaces so as to minimize the collection of dirt, debris, and other particulate contaminants, which may impact luminous intensity, and to facilitate periodic cleaning. External lens facets are prohibited.

6.9 The lens for the red ball and the red arrow shall be tinted red or may use transparent film materials with similar characteristics to enhance on/off contrasts.

6.10 The lens for the yellow ball and the yellow arrow shall be tinted yellow or may use transparent film materials with similar characteristics to enhance on/off contrasts.

6.11 The lens for the green ball and the green arrow shall be clear. No tinting or transparent film materials shall be used.

6.12 The use of tinting or other materials to enhance on/off contrasts shall not affect chromaticity and shall be uniform across the face of the lens.

7. MODULE IDENTIFICATION

7.1 Each LED Module shall have the manufacturers name, trademark, model number, serial number, date of manufacture (month and year) and lot number as identification permanently marked on the back of the module. This identification is required, and is in addition to any other identification that may be required in contract special provisions by the District of Columbia.

7.2 Rated voltage and rated power in Watts and Volt-Amperes shall also be permanently marked on the back of each LED module.

7.3 Each LED module shall have prominent and permanent markings for correct indexing and orientation within a signal head housing. The markings shall consist of an up arrow, or the word "UP" or "TOP" to ensure that the LED module is inserted into the signal-head housing with the correct orientation.

7.4 As detailed in section 5.5 of this specification, conductors connecting the LED module to the signal head housing terminal block shall be color coded to differentiate between the red ball, red arrow, yellow ball, yellow arrow, green ball, and green arrow LED module.

7.5 Each LED module shall have a symbol of the type of module (circular ball or arrow) in the color of the module. The symbol shall be one inch in diameter, and the color shall be written in one half inch letters next to the symbol.

8. PHOTOMETRIC REQUIREMENTS

8.1 The minimum initial and maintained minimum intensities for red ball, yellow ball, and green ball LED modules measured in candela (cd) at 25° C shall be as follows:

MINIMUM INITIAL INTENSITIES				MAINTAINED MINIMUM INTENSITIES		
Angle(v,h)	Red	Yellow	Green	Red	Yellow	Green
2.5,± 2.5	399	798	798	339	678	678
2.5, ± 7.5	295	589	589	251	501	501
2.5, ± 12.5	166	333	333	141	283	283
2.5, ± 17.5	90	181	181	77	154	154
7.5, ± 2.5	266	532	532	226	452	452
7.5, ± 7.5	238	475	475	202	404	404
7.5, ± 12.5	171	342	342	145	291	291
7.5, ± 17.5	105	209	209	89	178	178
7.5, ± 22.5	45	90	90	38	77	77
7.5, ± 27.5	19	38	38	16	32	32
12.5, ± 2.5	59	119	119	50	101	101
12.5, ± 7.5	57	114	114	48	97	97
12.5, ± 12.5	52	105	105	44	89	89
12.5, ± 17.5	40	81	81	34	69	69
12.5, ± 22.5	26	52	52	22	44	44
12.5, ± 27.5	19	38	38	16	32	32
17.5, ± 2.5	26	52	52	22	44	44
17.5, ± 7.5	26	52	52	22	44	44
17.5, ± 12.5	26	52	52	22	44	44
17.5, ± 17.5	26	52	52	22	44	44
17.5, ± 22.5	24	48	48	20	41	41
17.5, ± 27.5	19	38	38	16	32	32

8.2 The minimum initial and minimum maintained intensities for red arrow, yellow arrow, and green arrow LED modules measured in candelas per square meter (cd/m2) shall be as follows:

MODULE	MINIMUM INTIAL INTENSITIES	MINIMUM MAINTAINED INTENSITIES
Red Arrow	5,500	5,500
Yellow Arrow	11,000	11,000
Green Arrow	11,000	11,000

8.3 The red ball, red arrow, green ball, and green arrow LED module shall meet or exceed the illuminations values as shown in Section 8.1 and 8.2

throughout the useful life based upon normal use in traffic signal operations over the operating temperature.

8.4 The yellow ball and yellow arrow LED module shall meet or exceed the illumination values as shown in section 8.1 and 8.2 throughout the useful life bases upon normal use in a traffic signal operations at 25°C.

8.4.1 Within 5 minutes of turn-on, the initial luminous intensity of yellow ball LED modules shall meet that of ITE compliant green ball LED modules at 25°C, 120 Volts A.C. Yellow ball LED modules shall be compliant with CALTRANS specifications. CALTRANS laboratory compliance certificates shall be furnished prior to product acceptance.

8.5 The intensity of red ball and green ball LED modules shall not vary by more than 10% over the allowable voltage range.

8.6 Red ball and green ball LED modules shall meet the July, 1998 ITE VTCSH Part II standards and measurements criteria for LED modules. Test data to verify compliance of these LED modules with this standard, including all tests listed in Section 6.4 of this standard, shall be provided from either.

Lighting Services
7630 East Evan Road
Scottsdale, Arizona 85260

-or-

ETL Testing Laboratories
3933 U.S. Route 11
Cortland, New York 13045-0950

8.6.1 In addition, red ball and green ball LED modules shall be compliant with Clatrans specifications. Caltrans laboratory compliance certificates shall be furnished prior to product acceptance.

8.7 Red ball, red arrow, yellow ball and yellow arrow LED modules shall utilize AlInGaP technology exclusively, either AS (Absorbing Substrate) or TS (Transparent Substrate), and shall not exhibit degradation of more than 30% of the initial light intensity following accelerated life testing (operating at 85 Degrees C and 85% humidity for 1000 hours). AlGaAs technology shall be not be acceptable.

8.8 Green ball and green arrow LED modules shall utilize Indium gallium nitride (InGaN) technology. Green ball and green arrow LED modules shall not be illuminated when the applied voltage is less than or equal to 35 volts A.C. Illumination of green ball and green arrow LED modules shall be in compliance with the July, 1998 ITE VTCSH Part II when the applied voltage is between 80 and 135 Volts A.C.

8.9 The measured chromatically coordinates of the LED modules shall conform to the following chromatically requirements.

RED: Y: not greater than 0.308 or less than 0.998-x

YELLOW: Y: not less than 0.411, not less than 0.995 – x, not less than 0.452

GREEN: Y: not less than 0.506-0.519 x, nor less than 0.150 + 1.068x, not more than 0.730 – x

8.9.1 Chromaticity requirements shall pertain to both ball and arrow LED modules.

8.9.2 Chromaticity requirements shall be satisfied throughout the useful life of the LED modules over the operating temperature range.

8.10 Red arrow, yellow arrow, and green arrow LED modules shall contain not less than two (2) rows of LEDs forming the shape of the arrow.

8.10.1 Each LED arrow module shall meet the specifications stated in Section 9.01 of the ITE Publication Equipment and Materials Standards, Chapter 2 (Vehicle traffic Control Signal Heads) for arrow indications

8.10.2 LEDs shall be spread and arranged evenly across the illuminated portion of the arrow area.

9. QUALITY ASSURANCE

9.1 The modules shall be manufactured in accordance with a manufacturer quality assurance (QA) program. The QA program shall include two types of quality assurance: (1) design a quality assurance and (2) production quality assurance. The production quality assurance shall include statistically controlled routine tests to ensure minimum performance levels of the modules built to meet this specification, and a documented process of how problems are to be resolved.

9.2 QA process and test results documentation shall be kept on file for a minimum period of seven years.

9.3 LED signal module designs not satisfying design qualification testing and the production quality assurance testing performance requirements described below shall not be labeled, advertised, or sold as conforming to this specification.

9.4 Design Qualification Testing

9.4.1 Design Qualification Testing shall be performed by the manufacturer or an independent testing lab hired by the manufacturer on new LED module designs, and when a major design change has been implemented on an existing design.

9.4.2 A major design change is defined as a design change (electrical or physical) which changes any of the performance characteristic of the module, results in a different circuit configuration of the power supply, or changes the layout of other individual LED's in the module.

9.4.3 A quantity of two units for each design shall be submitted for Design Qualification Testing.

9.4.3.1 Test units shall be submitted to the District of Columbia after the manufacturer testing is complete.

9.4.3.2 Manufacturer's testing data shall be submitted with test units for District of Columbia verification of Design Qualification Testing data.

9.4.4 Burn In.

9.4.4.1 The sample modules shall be energized for a minimum of 24 hours, at 100 percent on-timed duty cycle, at a temperature of +74°C (+165°F) before performing any design qualification testing.

9.4.4.2 Any failure of the module, which renders the unit non-compliant with the specification after burn-in, shall be cause for rejection.

9.4.5 For Design Qualification Testing, all specifications will be measured including, but not limited to.

9.4.5.1 Rated Initial Luminous Intensity.
Measured over the operating temperature range.

9.4.5.2 Chromaticity (Color).
Measured over the operating temperature range.

9.4.5.3 Electrical.
All specified parameters shall be measured and used for quality comparison of production quality assurance on production modules. (rated power, etc.)

9.4.5.4 Equipment Compatibility.
Modules shall be tested for compatibility with the controller unit, conflict monitor, and load switch. Each signal modules shall be connected to the output of a standard load switch connected to an AC voltage supply between the values of 95 and 135 VAC with the input to the load switch in the "off" position. The AC voltage developed across each LED signal module so connected shall not exceed 10 Vrms as the input AC voltage is varied form 95 Vrms to 135 Vrms.

9.4.5.5 Mechanical vibration testing shall be as per MIL-STD-833, Test Method 2007, using 3 four minute cycles along each x, y, and z axis, at a force of 2.5 Gs, with a frequency sweep from 2 HZ to 120 HZ. The loosening of the lens, of any internal components, or other physical damage shall be cause for ejection.

9.4.5.6 Temperature cycling shall be performed as per MIL-STD-883, Test method 1010. The temperature range shall be per "Environmental Requirements". A minimum of 20 cycles shall be performed with a 30 minute transfer time between temperature extremes and a 30 minute dwell time at each temperature. Module(s) being tested shall be energized and functioning throughout the duration of the test. Failure of a module to function

properly or any evidence of cracking of the module lens or housing after temperature cycling shall be cause for rejection.

9.4.5.7 Moisture resistance testing shall be performed on all modules mounted in a standard polycarbonate vehicle signal head housing as specified for use in the District of Columbia per NEMA Standard 250-1991 for Type 4 enclosures. Any evidence of internal moisture after testing shall be cause for rejection.

9.5 Production Quality Control Testing

9.5.1 The following Production Quality Assurance tests shall be performed on each new module prior to shipment. Failure to meet requirements of any of these tests shall be cause for rejection. Test results shall be retained by the manufacturer for seven years (except for yellow LED modules)

9.5.2 Burn-in period shall consist of each signal module being energized at rated voltage for a 30 minute stabilization period before the measurement is made.

9.5.3 Each module shall be tested for rated initial intensity after burn-in.

9.5.3.1 A single point measurement, with a correlation to the intensity requirements of Section 1.04 of the VTCSH for circular modules, may be used.

9.5.3.2 The ambient temperature for this measurement shall be +25°C (+77°F)

9.5.3.3 Each LED Module failing to meet minimum luminous intensity requirements specified in Section 8.1 of these specifications shall be cause for rejection.

9.5.4 Each module shall be tested for required power factor after burn-in.

9.5.5 Each module shall be measured for current flow in amperes after burn-in. The measured current values shall be compared against rated values resulting from design qualification measurements under "Design Qualification Testing". The current flow shall not exceed the rated value.

9.5.6 Each module shall be visually inspected for any exterior physical damage or assembly anomalies. Careful attention shall be paid to the surface of the lens to ensure there are no scratches (abrasions), cracks, ships, discoloration, or other defects. Any such defect shall be cause for rejection

9.6 The manufacturer shall be required to undertake Design Qualification and Production Quality Control testing as specified in Section 9.4 and 9.5 of these specifications and report all results to the District of Columbia through the contractor. Procurement and installation of LED modules prior to the receipt and acceptance of test results by the District of Columbia is done at the contractors risk.

10. WARRANTY

10.1 The manufacturer shall provide a written warranty against defects in materials and workmanship for a minimum period of 60 months.

10.2 The warranty period shall begin on the date the LED module is energized and placed into service at the intersection, or ninety (90) days after delivery of the module to the District of Columbia, whichever occurs first.

10.3 Replacement LED modules shall be provided on a one for one basis promptly after receipt of LED modules that have failed. Replacement shall occur at no cost to the District of Columbia prior to random sample testing.

10.4 All warranty documentation shall be submitted to the District of Columbia prior to random sample testing.

10.5 Red ball and green ball LED modules shall be warranted to be in compliance with the July, 1998 ITE VTCSH, Part II specifications for luminous intensity for a period of 5 years, consistent with the provisions of Section 10.2.

TECHNICAL SPECIFICATION
Light Emitting Diode (LED) Pedestrian Signal Modules

1. The purpose of this specification is to describe the minimum acceptable design and operating requirements for 12-inch (300-mm) Light Emitting Diode (LED) pedestrian signal modules. The specific items included in this specification include the "RAISED HAND" and the "WALKING PERSON" in separate modules. The "RAISED HAND" and the "WALKING PERSON" shall not be combined into a single module.

2. GENERAL DESCRIPTION

2.1 This specification covers LED "RAISED HAND" and the "WALKING PERSON" modules to be used in place of the incandescent lamp, reflector socket, gasket and lens assembly of the pedestrian signal section. Each LED module shall consist of an assembly that utilizes LEDs as the light source in lieu of an incandescent lamp for use in pedestrian signal sections.

2.2 Pedestrian LED modules shall be engineered to fit in all ITE compliant conventional pedestrian signal housings. They shall fit in the conventional polycarbonate pedestrian signal head housing, as used in the District of Columbia, and as described in detail in an accompanying technical specification.

2.3 Each LED Module shall utilize appropriate technology to achieve the required color and shall be the ultra bright type rated for 100,000 hours of continuous operation from -40°C to +74°C.

2.4 Each LED module shall be rated for a minimum useful life of 48 months. All modules shall meet all parameters of this specification during this period.

2.5 Each individual LED module shall be wired such that a catastrophic loss or failure of one LED will result in the loss of not more than 5 percent of the signal module light output.

3. ELECTRICAL REQUIREMENTS

3.1 POWER CONSUMPTION

3.1.1 The maximum power consumption requirements measured in watts for each module are as follows:

MODULE	25°C	74°C
"RAISED HAND"	10.0W	12.0W
"WALKING PERSON"	12.0W	15.0W

3.2 OPERATING VOLTAGE

3.2.1 Each module shall operate from a 60HZ +- 3 HZ AC line over a voltage ranging from 95 volts to 135 volts. Fluctuations of line voltage shall have no visible effect upon the luminous intensity of the indications.

3.2.2 The operating voltage of the modules shall be 120 Volts AC. All operating parameters shall be measured at this voltage.

3.2.3 LED circuitry shall prevent perceptible flicker to the unaided eye over the 95 to 135 voltage range.

3.3 The LED signal module shall have a power factor of 0 90 or greater at a nominal rated voltage at 25°C after 60 minutes of operation.

3.4 Total harmonic distortion (current and voltage) induced into an AC power line by an LED signal shall not exceed 20 percent at the rated voltage at 25°C.

3.5 The signal module on-board circuitry shall include voltage surge protection to withstand high-repetition noise transients as stated in Section 2.1.6 of the NEMA Standard TS-2 dated 1992.

3.6 Each LED module and associated on-board circuitry shall be in compliance with Federal Communications Commission (FCC) noise regulations and must meet FCC Title 47, Subpart B, Section15 regulations concerning the emission of electronic noise.

3.7 The "RAISED HAND" and the "WALKING PERSON" LED modules shall be U.S. EPA-Energy Star compliant. Power consumption of these LED modules shall not exceed the maximum allowed by the EPA.

3.8 All wiring and terminal blocks must meet the requirements of Section 13.02 of the ITE Publication Equipment And Material Standards, Chapter 2 (Vehicle Traffic Control Signal Heads).

3.9 Each LED module shall be operationally compatible with controller assemblies and peripheral equipment including solid state load switches,

flashers, and conflict monitors currently used in the District of Columbia. Current controller specifications are available for review at the specific request of the contractor or vendor.

3.9.1 When a current of 20mA AC or less in applied to the unit, the voltage read across the two leads shall be 15 VAC or less.

3.10 Each LED module shall feature control circuitry to prevent current flow through the LED module in the off state to avoid any false indication as may be perceived by the human eye during daylight and evening hours.

4. ENVIRONMENTAL REQUIREMENTS

4.1 Each LED module shall be rated for use in operating temperatures in the range of -40°C (-40°F) to +74°C (+165°F). Each LED module shall meet all specifications throughout this temperature range.

4.2 Each LED module shall be protected against dust and moisture intrusion in conformance with NEMA Moisture Resistant Standard 250-1991 for Type 4 enclosures to protect all internal components.

5. CONSTRUCTION

5.1 Each LED Module shall be a single, self-contained device, not requiring on-site assembly for installation into an existing pedestrian signal housing.

5.2 The power supply for the LED module shall be integral to the unit.

5.3 The circuit board and the power supply shall be contained inside the module.

5.4 Each LED module shall incorporate a printed circuit board containing all required LEDs and circuit components. The LEDs shall be mounted and soldered to the printed circuit board.

5.5 Each LED module shall feature two 39-inch long 20AWG minimum wire lead with strain relief and spade terminals for connection to the terminal block of the signal heads. One of the conductors shall contain white insulation to signify neutral. The color of other conductor shall be different and shall be used to differentiate between the "RAISED HAND" and the "WALKING PERSON" LED modules. The two conductors shall be 600 Volt, 20 AWG minimum, jacketed wires conforming to the National Electric Code, rated for service at +105°C.

5.6 Each LED module shall feature a rigid housing for protection in shipping, handling and installation and a one-piece neoprene gasket. Screw-in type products are expressly prohibited for LED modules.

5.7 The assembly and manufacturing process for the LED signal assembly shall be designed to ensure that all internal components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.

5.8 Each LED module shall be watertight when properly installed in a pedestrian signal housing. Each LED module shall utilize the same mounting hardware used to secure the incandescent lens and gasket

assembly, and shall only require a screwdriver or a standard installation tool to complete the mounting.

5.9 Each LED module shall weigh less than 5 pound

6. MATERIALS

6.1 Materials used for the lens and signal module shall conform to the appropriate ASTM specification for the materials.

6.2 Enclosures containing either the power supply or electronic components of the signal module shall be made of UL94VO flame retardant materials. The module lens does not need to comply with this requirement.

6.3 The lens for the "RAISED HAND" LED Module and the "WALKING PERSON" LED module shall be clear with a textured surface to reduce glare.

6.4 Each LED module lens shall be UV stabilized plastic capable of withstanding ultra violet direct sunlight for a minimum period of 5 years without exhibiting evidence of deterioration.

6.5 The external lens surface shall be smooth with no raised features, so as to minimize the collection of dirt, debris, and other particulate contaminants, which may impact luminous intensity, and to facilitate periodic cleaning. External lens facets are prohibited.

7. MODULE IDENTIFICATION

7.1 Each LED module shall have the manufacturers name, trademark, model number, serial number, date of manufacture (month and year) and lot number as identification permanently marked on the back of the module. This identification is required, and is in addition to any other identification that may be required in contract special provisions by the District of Columbia.

7.2 Rated voltage and rated power in Watts and Volt Amperes shall also be permanently marked on the back of each LED module.

7.3 Each LED module shall have prominent and permanent markings for correct indexing and orientation within a signal head housing. The markings shall consist of an up arrow, or the word "UP" or "TOP" to ensure that the LED module is inserted into the signal head housing with the correct orientation.

7.4 As detailed in Section 5.5 of this specification, conductors connecting the LED module to the signal head housing terminal block shall be color coded to differentiate between the "RAISED HAND" and the "WALKING PERSON" LED module.

8. PHOTOMETRIC REQUIREMENTS

8.1 Each "RAISED HAND" LED module shall provide an average luminous intensity of 3,750 candela per square meter throughout the useful life and over the operating temperature range.

8.2 Each "WALKING PERSON" LED module shall provide an average luminous intensity of 5,300 candela per square meter throughout the useful life and over the operating temperature range.

8.3 The uniformity ratio of an illuminated symbol shall not exceed 4 to 1 between the highest luminance area and the lowest luminance area in the LED module.

8.4 The color output of each LED module shall conform to the requirements of Section 5.3 in the ITE Publication Equipment and Material Standards, Chapter 3, (Pedestrian Traffic Control Signal Indications).

8.4.1 The "RAISED HAND" within the LED module shall be Portland orange. Not greater than 0.390,not less than 0.331, nor less than 0.997 –x

8.4.2 The "WALKING PERSON" shall be lunar white
X: not less than 0.290 nor greater than 0.330
Y: not less than 1.5x-0.175, or greater than 1.5x-0.130

8.5 Both the "RAISED HAND" and the "WALKING PERSON" LED modules shall be filled with LED's to give the appearance that the entire image is illuminated when energized. Outlined images will not be permitted.

8.6 The height of the "RAISED HAND" and the "WALKING PERSON" images on the module shall not be less than 250 mm and the width of each image shall not be less than 165 mm.

9. QUALITY ASSURANCE

9.1 The modules shall be manufactured in accordance with a manufacturer quality assurance (QA) program. The QA program shall include two types of quality assurance: (1) design quality assurance and (2) production quality assurance. The production quality assurance shall include statistically controlled routine tests to ensure minimum performance levels of the modules built to meet this specification, and a documented process of how problems are to be resolved.

9.2 QA process and test results documentation shall be kept on file for a minimum period of seven years.

9.3 LED signal module designs not satisfying design qualification testing and the production quality assurance testing performance requirements described below shall not be labeled, advertised, or sold as conforming to this specification.

9.4 Design Qualification Testing

9.4.1 Design Qualification testing shall be performed by the manufacturer or an independent testing lab hired by the manufacturer on new LED module designs, and when a major design change has been implemented on an existing design.

9.4.2 A major design change is defined as design change (electrical or physical) which changes any of the performance characteristics of the module, results in a different circuit configuration for the power supply, or changes the layout of the individual LED's in the module.

9.4.3 A quantity of two units for each design shall be submitted for Design Qualification Testing.

9.4.3.1 Test units shall be submitted to the District of Columbia after the manufacturer's testing is complete.

9.4.3.2 Manufacturer's testing data shall be submitted with test units for the District of Columbia verification of Design Qualification Testing data.

9.4.4 Burn In.

9.4.4.1 The sample modules shall be energized for a minimum of 24 hours, at 100 percent on-time duty cycle, at a temperature of +74°C (+165°F) before performing any design qualification testing.

9.4.4.2 Any failure of the module, which renders the unit non-compliant with the specification after burn-in, shall be cause for rejection.

9.4.5 For Design Qualification Testing, all specifications will be measured including, but not limited to:

9.4.5.1 Rated Initial Luminous Intensity. Measured over the operating temperature range.

9.4.5.2 Chromaticity (Color). Measured over the operating temperature range.

9.4.5.3 Electrical.

All specified parameters shall be measured and used for quality comparison of production quality assurance on-production modules (rated power, etc.)

9.4.5.4 Equipment Compatibility.

Modules shall be tested for compatibility with the controller unit, conflict unit, conflict monitor, and load switch. Each signal module shall be connected to the output of a standard load switch connected to an AC voltage supply between the values of 95 and 135 VAC with the input to the load switch in the "off" position. The AC voltage developed across each LED signal module so connected shall not exceed 10 Vrms as the input AC voltage is varied from 95 Vrms to 135 Vrms.

9.4.5.5 Mechanical vibration testing shall be as per MIL-STD-883, Test Method 2007, using 3-four-minute cycles along each x, y, and z axis, at a force of 2.5 Gs, with a frequency sweep from 2 HZ to 120 HZ. The loosening of the lens, of any internal components, or other physical damage shall be cause for rejection.

9.4.5.6 Temperature cycling shall be performed as MIL-STD-883, Test method 1010. The temperature range shall be per "Environment Requirements". A minimum of 20 cycles shall be performed with a 30 minute transfer time between temperature extremes and a 30 minute dwell time at each temperature. Module(s) being tested shall be energized and functioning throughout the duration of the test. Failure of a module to function properly or any evidence of cracking of the module lens or housing after temperature cycling shall be cause for rejection.

9.4.5.7 Moisture resistance testing shall be performed on all modules mounted in a standard type "A" pedestrian housing per NEMA Standard 250-1991 for Type 4 enclosures. Any evidence of internal moisture after testing shall be cause for rejection.

9.5 Production Quality Control Testing

9.5.1 The following Production Quality Assurance shall be performed on each new module prior to shipment. Failure to meet requirements of any of these tests shall be cause of rejection. Test results shall be retained by the manufacturer for seven years.

9.5.2 Burn-in period shall consist of each signal module being energized at rated voltage of a 30 minute stabilization period before the measurement is made.

9.5.3 Each module shall be tested for rated initial intensity after burn-in.

9.5.3.1 A single point measurement, with a correlation to the intensity requirements of Section 1.04 of the VTSCH for circular modules, may be used.

9.5.3.2 The ambient temperature for this measurement shall be +25°C (+77°F).

9.5.3.3 Each module not meeting minimum luminous intensity requirements of 3,750 cd/m2 for the raised hand symbol and 5,300 cd/m2 for the walking person symbol shall be cause for rejection

9.5.4 Each module shall be tested for required power factor after burn-in.

9.5.5 Each module shall be measured for current flow in amperes after burn-in. The measured current values shall be compared against rated values resulting from design qualification measurements under "Design Qualification Testing". The current flow shall not exceed the rated value.

9.5.6 Each module shall be visually inspected for any exterior physical damage or assembly anomalies. Careful attention shall be paid to the surface of the lens to ensure there are no

scratches (abrasions), cracks chips, discoloration, or other defects. Any such defect shall be cause for rejection.

9.6 The manufacturer shall be required to undertake Design Qualification and Production Quality Control testing as specified in Section 9.4 and 9.5 of these specifications and report all results to the District of Columbia through the contractor. Procurement and installation of LED modules prior to the receipt and acceptance of test results by the District of Columbia is done at the contractors risk.

10. WARRANTY

10.1 The manufacturer shall provide a written warranty against defects in materials and workmanship for a minimum period of 60 months after acceptance of the modules.

10.2 Replacement LED modules shall be provided on a one for one basis promptly after receipt of LED modules that have failed at no cost to the District of Columbia.

10.3 All warranty documentation shall be submitted to the District of Columbia prior to the random sample testing.

10.4 The warranty period shall begin on the date the LED module is energized and placed into service at the intersection, or ninety (90) days after delivery of the module to the District of Columbia, whichever occurs first.

TECHNICAL SPECIFICATION
Conventional Polycarbonate Vehicle Signal Head

1. The purpose of this specification is to describe the minimum acceptable design and operating requirements for 12 inch conventional vehicle signal heads. Each signal head section shall be capable of being joined together to form a vehicle signal head featuring two to five sections. Each section shall be capable of accepting a 12 inch LED (Light Emitting Diode) module insert with legends to control vehicle traffic.

2. SIGNAL HEAD HOUSING

2.1 As a minimum, the signal heads shall meet or exceed the requirements set forth in the latest standard of the Institute of Transportation Engineers (ITE).

2.2 The signal heads shall be constructed from ultraviolet stabilized virgin polycarbonate resin.

2.3 The signal heads shall have a minimum thickness of 0.100 inches.

2.4 Unless otherwise specified, the color of the signal head shall be battleship grey, MVCL 14187, GE LEXAN Number 70402. This color shall be impregnated throughout the body of the signal head. Federal black may be required in certain specified applications.

2.5 Each signal head section shall be capable of being joined together to form a vehicle signal head featuring 2 to 5 sections arrayed as defined in the Manual on Uniform traffic Control Devices (MUTCD). Each signal section shall feature an opening on the top and bottom of the section capable of accommodating at least three 0.75 inch diameter cables.

2.6 Each signal head section shall feature stainless steel hardware, where appropriate.