



CITY OF TACOMA
Public Works Engineering

ADDENDUM NO. 1

DATE: 11/23/2021

REVISIONS TO:
Request for Bids Specification No. PW21-0719F
South Yakima Signal and Safety Improvements

NOTICE TO ALL BIDDERS:

This addendum is issued to clarify, revise, add to or delete from, the original specification documents for the above project. This addendum, as integrated with the original specification documents, shall form the specification documents. The noted revisions shall take precedence over previously issued specification documents and shall become part of this contract.

REVISIONS TO THE SUBMITTAL DEADLINE:

The submittal deadline remains the same.

REVISIONS TO THE SPECIAL PROVISIONS:

The following Special Provisions Sections are deleted and replaced with the Sections as marked Addendum No.1: 2-01, 8-13, 8-14, 8-20, 8-22, 9-29.

REVISIONS TO THE PLANS:

The following plan sheets are deleted and replaced with the sheets as marked Addendum No 1: D-1, D-2, C-1, C-2, SG-1, SG-4, SG-4A, SG-7, CH-1.

REVISIONS TO THE PROPOSAL PAGES:

The entire Bid Proposal is deleted and replaced with the Bid Proposal as marked Addendum No.1..

NOTE: Acknowledge receipt of this addendum by initialing the corresponding space as indicated on the signature page. Vendors who have already submitted their bid/proposal may contact the Purchasing Division at 253-502-8468 and request return of their bid/proposal for acknowledgment and re-submittal. Or, a letter acknowledging receipt of this addendum may be submitted in an envelope marked Request for Bids Specification No. PW21-0719F Addendum No. 1. The City reserves the right to reject any and all bids, including, in certain circumstances, for failure to appropriately acknowledge this addendum.

cc: Darius Thompson/PW

2-01 CLEARING, GRUBBING, AND ROADSIDE CLEANUP

(*****)

2-01.1 Description

The first sentence of the first paragraph is revised to read:

The Contractor shall clear, grub, and cleanup those areas within the area of ground disturbance in accordance with the Plans and Specifications and as needed to complete the Contract Work.

This section is supplemented with the following:

Tree root cutting and cutting branches and tree limbs to clear overhead wires is included in the Work. Trees, stumps, shrubs, and brush shall be considered as part of “Clearing and Grubbing” where these are an obstacle to the Work in the Contract, or when identified for removal on the Plans.

2-01.2 Disposal of Usable Material and Debris

The second paragraph is revised to read:

The Contractor shall dispose of all debris in accordance with Section 2-01.2(2).

(*****)

2-01.3(1) Clearing

This section is revised to read:

1. Fell trees within the area to be cleared and individual trees as shown on the Plans.
2. Close-cut parallel to the slope of the ground all stumps to be left in the cleared area outside the slope stakes.
3. Close cut all stumps that will be buried by fills 5-feet or less in depth.
4. Follow these requirements for all stumps that will be buried by fills deeper than 5-feet from the top, side, or end surface of the embankment or any structure and are in a location that will not be terraced as described in Section 2-03.3(14):
 - a. Close-cut stumps under 18-inches in diameter.
 - b. Trim stumps that exceed 18-inches in diameter to no more than 12-inches above original ground level.
5. Leave standing any trees or native growth indicated by the Engineer.
6. Trim all trees to be left standing to the height specified by the Engineer and certified Arborist, with a minimum height of eight (8) feet above sidewalk and fourteen (14) feet above the roadway surface. Neatly cut all limbs close to the tree trunk. All tree trimming must be done as directed by the Engineer.
7. Thin clumps of native growth as the Engineer may direct.
8. Protect, by fencing if necessary, all trees or native growth from any damage caused by construction operations in accordance with Standard Plans LS-08 through LS-11. This shall be included in the lump sum Contract price for the Bid item “Clearing and Grubbing”.
9. Trim all shrubs and brush which covers sidewalks, curb, curb and gutter, and curb ramps to a minimum of four inches from the edge of sidewalk or as directed by the Engineer.

10. Remove and dispose of, or relocate the following existing features where necessary within the project limits or as indicated on the Plans:
 - a. Cement concrete gutter boxes.
 - b. Large rocks, garden stone, or other stones used for the purpose of landscaping or as a barrier when inside the paving limits.
 - c. Wood curbs, logs, railroad ties, and other timber used for landscaping when inside the paving limits.
 - d. All types of fence.
 - e. Bollards inside the paving area and not designated to remain.
 - f. Relocate Eco Blocks to a location outside of the paving limits.
11. Remove trees as indicated on the plans or as directed by the Engineer or certified Arborist. The tree removal shall include stump grinding to eight inches below final grade and removal of roots according to the Plans and Specifications, and as directed by the Engineer and certified Arborist, such that a new tree can be planted in the same area.
12. Remove, trim, prune tree roots or limbs as directed by the Engineer and as shown per Plans. Roots and tree limbs shall be clean cut with a saw and shall not be torn.
13. All stumps identified for stump grinding or as directed by the Engineer or certified Arborist shall be ground to eight inches below final grade.

2-01.3(2) Grubbing

Item e is revised to read:

Upon which embankments will be placed, except stumps may be close-cut or trimmed as allowed in Section 2-01.3(1) item 4.

2-01.3(5) Definition of Vegetation

A “tree” is defined as any self-supporting, woody perennial plant having a main stem (trunk) and which normally attains a height of at least ten (10) feet at maturity.

A “shrub” is defined as any woody perennial plant which normally attains a height of less than ten (10) feet at maturity and which can be construed to have some landscape value.

“Brush” is defined as any perennial vegetation which normally attains a height of ten (10) feet or less at maturity, which is not maintained as part of a landscape feature, which is “volunteer” growth or which exists in a naturalized state. Examples include but are not limited to stands of blackberries and scotch broom.

2-01.3(5) Tree and Stump Classifications

Trees shall be classified by the measured diameter at a point four and one-half (4-½) feet above average ground level. Trees that have several stems at the four and one-half (4-½) foot height will be considered a tree clump. The largest diameter single stem will be measured and will dictate the class rating. Only the largest, single stem in the clump will be utilized for measurement and payment.

Stumps shall be classified by the measured diameter at the highest point of the stump above the average ground level or a point four and one-half (4-1/2) feet above the average ground level, whichever is less.

Trees and stumps will be classified as follows:

Less than 4 inches	Class 0
4 inches up to but not including 12 inches	Class I
12 inches up to but not including 24 inches	Class II
24 inches up to and including 42 inches	Class III
Greater than 42 inches (Tree height greater than 30 feet)	Class IV
Greater than 42 inches (Tree height of 30 feet or less)	Class V

2-01.5 Payment

(*****)

The Bid item "Clearing and Grubbing" is supplemented with the following:

In addition, the lump sum Contract price for "Clearing and Grubbing" shall be full pay for the following per Plans and as directed by the Engineer:

- native growth protection and tree protection, including tree protection fencing in accordance with Standard Plans LS-08 thru LS-11
- tree root trimming as directed by the Engineer or Arborist
- cutting tree limbs or branches away from street lights, overhead electrical wires, strain cables, and communication lines

In addition, the lump sum Contract price for "Clearing and Grubbing" shall include payment for removal of obstructions and for removal, salvage, and relocation of items as indicated on the Plans, that are not included in other bid items in the Proposal.

END OF SECTION

8-13 MONUMENT CASES
(***)**

This section is revised to read:

8-13 MONUMENTS

8-13.1 Description

This Work shall consist of constructing monuments in accordance with the Standard Plan and these Specifications, in conformity with the lines and locations shown in the Plans or as staked by the Engineer.

8-13.2 Materials

Concrete shall be Class 3000 in accordance with the requirements of Section 6-02. 'Ready Mix' bag concrete shall not be used.

Brass markers will be supplied by the Contracting Agency.

8-13.3 Construction Requirements

The Contractor shall adhere to WAC 332-120, DNR Application for Permit to Remove or Destroy a Survey Monument", when removing existing survey monuments.

The Contractor shall construct the poured monument in accordance with the City of Tacoma Standard Plan SU-01.

8-13.4 Measurement

Measurement of the poured monument will be per each.

8-13.5 Payment

Payment will be made in accordance with Section 1-04.1.

"Poured Monument", per each.

The unit Contract price per each for "Poured Monument" shall be full pay for all labor, equipment, and materials required to furnish and install the monument, including the removal of existing monuments, in accordance with the Standard Plan and these Specifications.

END OF SECTION

8-14 CEMENT CONCRETE SIDEWALKS

(*****)

8-14.3 Construction Requirements

This Section is supplemented with the following:

8-14.3(3) Placing and Finishing Concrete

The fourth paragraph is revised to read:

The Contractor shall construct curb ramps in accordance with the details in the Plans. The detectable warning pattern shall have the truncated dome shape shown in the Standard Plans.

8-14.3(4) Curing

The second sentence is revised to read:

Curing shall be in accordance with Section 5-05.3(13).

Section 8-14 is supplemented with the following:

8-14.3(5)C Surface Applied Detectable Warning Surfaces

This Section is supplemented with the following:

Surface applied detectable warning surfaces shall be in accordance with the Standard Plans, and Standard Plan SU-5H.

8-14.3(20) Cold Weather Work

The following additional requirements for placing concrete shall be in effect from November 1 to April 1:

1. The Engineer shall be notified at least 24 hours prior to placement of concrete.
2. All concrete placement shall be completed no later than 2:00 p.m. each day.
3. Where forms have been placed and the subgrade has been subjected to frost, no concrete shall be placed until the ground is completely thawed. At that time, the forms shall be adjusted and subgrade repaired as determined by the Engineer.

8-14.3(21) Thickened Edge for Sidewalk

Thickened edge shall be constructed in accordance with the standard plan.

8-14.5 Payment

The pay item "Cement Conc. Sidewalk" is supplemented with the following:

All additional costs related to the construction of thickened edges shall be included in the Contract unit price for "Cement Conc. Sidewalk".

All additional costs related to the construction of pedestrian curbs adjacent to curb ramps and landings shall be included in the Contract unit price for "Cement Conc. Curb Ramp".

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 8-14

1 All additional costs related to excavation needed to construct the sidewalk and curb ramps to
2 grade in accordance with the Plans and Specifications shall be included in the Contract unit
3 price for “Cement Conc. Sidewalk” or “Cement Conc. Curb Ramp”.

4
5
6 *This section is supplemented with the following:*

7
8 “Cement Conc. Curb Ramp”, per each

9
10 The unit Contract price per each for “Cement Conc. Curb Ramp” shall be full pay for
11 excavation, haul and disposal, installing the complete curb ramp per Plans and Specifications,
12 and as directed by the Engineer, including ramps, landings, pedestrian curbs, flares, wings, and
13 detectable warning surfaces as specified.

14
15
16 **END OF SECTION**
17
18

**8-20 ILLUMINATION, TRAFFIC SIGNAL SYSTEMS, AND ELECTRICAL
(June 14, 2021 Tacoma GSP)**

8-20.1(3) Permitting and Inspections

The third paragraph is revised to read:

All new services require a Tacoma Public Utilities Permit and inspection by Tacoma Power.
All work on the load side of the service will be inspected by the Signal and Streetlight Shop
Inspector.

8-20.2 Materials

This section is supplemented with the following:

The Contractor shall warranty all electrical and mechanical equipment described in this
section for satisfactory in service operation for one year following project acceptance.
Warranty shall include troubleshooting, labor, materials and all other costs to bring the
equipment to a satisfactory level of service. Normal maintenance is not included in the
warranty.

8-20.2(1) Equipment List and Drawings

This section is revised to read:

Within 20 days following execution of the Contract, the Contractor shall submit to the
Engineer a completed "Request for Approval of Material" that describes the material
proposed for use to fulfill the Plans and Specifications.

The Contractor shall submit Type 2 Working Drawings consisting of supplemental data,
sample articles, or both, of the material proposed for use. Supplemental data includes such
items as catalog cuts, product Specifications, shop drawings, wiring diagrams, etc.

The Contractor shall submit Type 2 Working Drawings consisting of the following information
for each different type of luminaire required on the Contract:

1. Isocandela diagrams showing vertical light distribution, vertical control limits, and
lateral light distribution classification.
2. Details showing the lamp socket positions with respect to lamp and refractor for each
light distribution type. This requires that the Contracting Agency know what the light
pattern available are and the light distribution.

Additional submittals for proposed alternate LED Roadway Luminaires shall be in
conformance with section 9-29.10.

The Contractor shall submit for approval Type 3E Working Drawings in accordance with
[Section 1-05.3](#) for each type of light standard and each type of signal standard called for on
this project.

The Engineer's acceptance of any submitted documentation shall in no way relieve the
Contractor from compliance with the safety and performance requirements as specified
herein.

Submittals required shall include but not be limited to the following:

1. A Type 2 Working Drawing consisting of a material staging plan, should the Contractor propose Contracting Agency-owned property for staging areas.
2. A Type 2 Working Drawing consisting of a cable vault installation plan showing the exact proposed installation location by Roadway station, offset and the scheduled sequence for each cable vault installation.
3. A Type 2E Working Drawing consisting of a pit plan, for each boring pit, depicting the protection of traffic and pedestrians, pit dimensions, shoring, bracing, struts, walers, sheet piles, conduit skids, and means of attachment, casing type, and casing size.
4. A Type 2E Working Drawing consisting of a boring plan depicting the boring system and entire support system.

8-20.3 Construction Requirements

8-20.3(1) General

This section is supplemented with the following:

The Contractor shall call 24 hours prior for inspection before covering any underground conduit, prior to installing any detection loops, or placing concrete for foundations. For inspections, notify Traffic Signal/Streetlighting at (253) 591-5287.

Work shall be sequenced such that after the new signal is placed in operation, the Contractor shall remove any equipment not required for the operation of the new signal. The Contractor shall remove the old vehicle and pedestrian signal heads immediately after the new system is operational.

For new signals, the contractor shall provide a Portable Message Change Sign in each direction and operate the PMCS for one week before, and one week after activating the new signal. This work shall be paid for in accordance with Section 1-10.

Uniformed police officers shall be provided by the Contractor to direct traffic at any time the signal is not in normal operation. This work shall be paid for in accordance with Section 1-10.

When construction operations are such that an existing traffic signal is required to be overridden or countermanded to allow for traffic control measures, only a uniformed police officer shall override the signal.

All police officers serving to support the Work shall be commissioned within the State of Washington.

All costs associated with procuring and accommodating the services of police officers shall be included in the lump sum Contract price for "Project Temporary Traffic Control".

Tacoma Police Department officers shall be the first choice for traffic control that overrides any traffic signal within the jurisdiction of the City of Tacoma PD.

The Contractor shall first contact Tacoma Police Department, Special Events Sergeant, to schedule police officers for the specified traffic control duty.

Tacoma Police Department
Special Events Sergeant
(253) 591-5932
TacomaPoliceEvents@ci.tacoma.wa.us

The Contractor shall request officers at least 48 hours in advance for scheduling, unless an exception is approved by the Engineer.

The Contractor shall immediately notify the Engineer in writing if Tacoma PD cannot supply officers for the requested date(s). The Contractor shall include the written response from Tacoma PD and state the preference to either postpone the affected Work or request officers from other State of Washington jurisdictions. Using officers from other jurisdictions must be approved by the Engineer.

The Contracting Agency may stop work in accordance with Section 1-08.6, "Suspension of Work", if the Contractor uses any off-duty officers from other jurisdictions to perform traffic control without prior approval from the Engineer.

The following existing and temporary equipment shall be deconstructed/removed by the Contractor and delivered to the City of Tacoma Signal/Streetlight Shop located at 3401A South Orchard Street. Care shall be exercised in removing and salvaging the equipment. Any equipment damaged during removal, hauling, and stockpiling shall be repaired or replaced by the Contractor at no expense to the City.

- All signal heads and mounting hardware
- Flashing beacons, and flasher control panel
- Steel poles, mast arms, and hardware
- Aluminum poles, mast arms, and hardware
- Controller cabinets and all internal hardware and wiring
- Vehicle detection systems, including video, microwave, and infrared systems, and associated hardware
- All Opticom equipment or other preemption and priority equipment.
- LED luminaries, LED retrofit kits, and LED lamps
- Ornamental/Decorative fixtures and poles/posts
- Pedestrian signals, poles, and pushbuttons.
- Signs, brackets, and hardware
- Locking junction box security lids, security bolts, and all other wire theft deterrent security hardware

All other equipment shall be removed of and disposed of by the Contractor, including but not limited to the following:

- Wood poles
- All wiring outside of the controller cabinet
- Loops
- Non-LED cobra-head fixtures

8-20.3(4) Foundations

This section is supplemented with the following:

Breakaway Base Connection brackets for pedestrian pushbutton poles (Type PPB) shall be installed with the flanges parallel to the traveled way, as shown on WSDOT standard plan J-20.15-03.

Anchor bolts for streetlight standards and for strain poles shall extend a minimum of two threads and a maximum of six threads above the top heavy-hex-nut. A minimum of three threads shall remain between bottom of the leveling hex-nut and the top of the foundation.

Foundations shall be excavated using an auger and poured against undisturbed material unless otherwise approved by the Engineer. Vacuum excavation should be used where there is a possibility of conflict with utilities or other facilities.

Forming the foundation with galvanized culvert pipe or similar forming methods will only be allowed when soil conditions or other factors make this method of construction necessary and is approved by the Engineer. Biodegradable forming tubes shall be fully removed from the cured concrete prior to backfilling. When using culvert or tubes, the following backfill requirements will apply. The area between the form and undisturbed material shall be filled with CDF. For lightly loaded installations and only with the approval of the Engineer, Crushed Surfacing Top Course meeting the requirements of Section 9-03.9(3) may be used. Placement shall be in accordance with Section 2-09.3(1)E and shall be backfilled and compacted in the presence of the Engineer.

8-20.3(5) Conduit

8-20.3(5)A General

This section is supplemented with the following:

Unless otherwise specified in the plans and specifications, standard conduit sizes shall be as follows:

- Underground Streetlight Conduit: 2 inch diameter
- Pole Riser Service Installations: 1-1/2 inch diameter
- Traffic Signal Conduit: 3 inch diameter
- Traffic Signal Communication: 3 inch diameter
- All other conduit: 2 inch diameter, unless otherwise specified.

As soon as the mandrel has been pulled through, both ends of the conduit shall be sealed in an approved manner. Location wire, in conformance with 9-29.3(2)A4 and Pull Tape, in conformance with 9-29.1(10), shall be installed in all empty conduits. At least three (3) feet of the location wire and pull tape shall be neatly coiled and secured to the conduit in the same manner as is shown in Washington State Department of Transportation Standard Plan J-28.70-01, Details A and B.

8-20.3(5)B Conduit Type

This section is supplemented with the following:

Conduit under driveways and other vehicular access ways shall be Schedule 80 high-density polyethylene (HDPE), Schedule 80 PVC, or rigid metal conduit (RMC)

Conduit installed in a joint trench, with power, and that is installed a minimum of 36-inches from finished grade may utilize Schedule 40 PVC in lieu of Schedule 80 PVC. This allowance shall not be construed to permit the use of dissimilar materials in a single run.

Pole riser conduit material types shall be in accordance with applicable City of Tacoma standard plans.

8-20.3(5)D Conduit Placement

This Section is supplemented with the following:

Conduit terminating in pole foundations shall extend to 3 inches below the handhole.

Conduit terminating in controller foundations shall terminate 1 inch above the foundation.

8-20.3(5)E1 Open Trenching

Subsection 5 is revised to read:

5. Trenches located within the paved roadway shall be backfilled with 3 inches of sand over the conduit, followed by material meeting the requirements of Section 9-03.12(3). Compaction shall be in conformance with Section 2-09.3(1)E. All street cuts shall be repaired in accordance with the standard plans.

This section is supplemented with the following new Subsections:

7. Where multiple conduit are installed in the same trench, the trench shall be of sufficient width to accommodate all conduit, with a minimum 3-inch separation between each conduit, and a minimum clearance of 1-inch on the sides of the trench. When conduit is laid horizontal to one another, the conduit shall be laid at the same elevation, parallel with one another. When conduit is laid vertically in the same trench, conduit spacers shall be used to maintain the 3-inch separation. Spacers shall be installed in accordance with the manufacturer's recommendations for conduit of that size and type. Additional spacers shall be required where the supported conduit is sagging more than 20% of the nominal diameter of the conduit.
8. In all conduit trenches, metallic, detectible, utility warning tape shall be placed at twelve (12) inches below final grade.

8-20.3(6) Junction Boxes, Cable Vaults, and Pull boxes

This section is supplemented with the following:

Unless otherwise specified in the plans, or as otherwise directed by the engineer, all junction boxes exposed to vehicular traffic shall be Heavy-Duty. Field adjustment of junction boxes, which cause junction boxes to be installed within an intersection radius and within four feet of the curb face may be required to be Heavy-Duty. Final placement and type of all junction boxes within an intersection shall be as directed by the Engineer.

Adjacent junction boxes shall be separated by a minimum of three-inches.

Concrete meeting the requirements of 6-02.3(2)B shall be placed surrounding all junction boxes except as otherwise provided for below. Concrete shall be flush with the top of the

junction box and the adjacent improvements. Concrete shall be cast in place. Junction boxes shall be secured with the concrete border as follows:

1. When the junction box is located within a concrete or asphalt section and is located a minimum of 12-inches from the edge of the section, a concrete border will not be required.
2. Where junction boxes are located within 12-inches from the edge of the concrete or asphalt section, the junction box shall be secured on all sides with a minimum 12-inch wide, 6-inch deep concrete section. Concrete shall be finished in the same manner as the adjacent concrete where applicable.
3. Where junction boxes are located within a planter strip, a landscaped area, or other non-hardened surface, the junction box shall be bordered on all sides with a minimum 6-inch wide, 12-inch deep concrete section flush with the top of the junction box.

When setting a new junction box on an existing streetlight circuit where no equipment ground is present, a non-conductive junction box and lid shall be utilized.

All junction box lids for illumination systems shall be welded in place using two one and one-half inch long welds on opposite corners of the junction box lid and frame. Welding shall occur after inspection and testing of the illumination system and confirmation from the Engineer. An Illumination System may consist of a separate illumination service or circuit.

8-20.3(7) Messenger Cable, Fittings

The second paragraph of this section is deleted.

This section is supplemented with the following:

Cable ties shall be used to neatly secure the signal cable to the span wire at 10-inch centers and shall be tightened at top. Excess tie material shall be completely cut off. The signal control cable shall be below the span wire and shall be straight with no twisting or spiraling.

A minimum 5% sag shall be provided in the span wire when fully loaded with all vehicular signal heads, unless otherwise directed by the Engineer.

8-20.3(8) Wiring

The third paragraph is revised to read:

All splices in underground illumination circuits, induction loop circuits, and magnetometer circuits shall be installed at junction boxes. The only splice allowed in an induction loop circuit shall be the shielded cable to loop wire splice. The only splice allowed in a magnetometer circuit shall be the probe lead-in cable to the magnetometer cable splice.

Induction loop splices and magnetometer splices shall be heat shrink type with moisture blocking material, sized for the conductors. Magnetometer and induction loop splices shall be soldered. The end of the sheathing shall be sealed with a heat shrink insulator.

The fourth paragraph is revised to read:

Signal wiring shall be in conformance with the following:

1. All termination for traffic signal control systems shall be in accordance with City of Tacoma Standard Plan TS-15.
2. All signal wiring shall be 14 gauge 5-conductor or 12 gauge 2-conductor stranded copper wire unless otherwise shown in the plans.
3. For 5-section heads, 2-5c-14 gauge conductors shall be utilized.
4. 5c wire shall not be split between high voltage and low voltage. Where a pedestrian head and a pedestrian push button share a common pole, a separate 2c shall be pulled in for the push button.
5. A single 5c may be split between two pedestrian heads on a common pole with a jumper across the neutral.
6. Opticom and detection wiring shall be per manufacturer's recommendations.

All wiring entering the cabinet shall be gathered across the conduits to the right front of the cabinet, neatly tied, and circle the base of the cabinet counterclockwise as further described below:

1. Communication cables shall circle the base of the cabinet, counterclockwise from front right, one full circle, and around to the back of the right panel. Cables shall follow up the back of the right panel and terminate on the terminal strip identified by the Engineer. Unless otherwise directed by the Engineer, cable outer jacket sheathing shall be removed from a point two (2) inches below the terminal strip. Cables shall be uniform in length, with sufficient slack to reach any terminal on the terminal strip. Individual wire slack shall be neatly looped back and tied. A bolt/flanged nut alligator jaw shield bond connector shall be utilized.
2. Power service conductors shall circle the base of the cabinet, counterclockwise from front right, one full circle, and back around to the front right of the base.
3. Detection cables shall circle the base of the cabinet, counterclockwise from front right, to the back of the left panel. Cables shall follow up the back of the left panel and terminate as directed in the field.
4. Signal vehicle and pedestrian head shall circle the base of the cabinet, counterclockwise from front right, to back left. Cable outer jacket sheathing shall be removed from the point that the conductor reaches the back left of the cabinet to the ends of the conductors. All vehicle and pedestrian conductors in the cabinets shall be uniform in length, with sufficient slack to reach any terminal on the load bay. Individual wire slack shall be neatly looped back and tied.
5. Push button conductors shall circle the base of the cabinet, counterclockwise from front right, to front left. Cable outer jacket sheathing shall be removed from the point that the conductor reaches the front left of the cabinet to the ends of the conductors. All push button conductors in the cabinets shall be uniform in length, with sufficient slack to reach any terminal on the terminal strip. Individual wire slack shall be neatly looped back and tied.

The fifth paragraph is revised to read:

Splices and taps on underground and overhead circuits shall be made with solderless crimp connectors, installed with an approved tool designed for the purpose, to securely join the wires both mechanically and electrically. Splices and taps will be sealed in accordance with this section.

The seventh paragraph is revised to read:

Aerial illumination splices shall be taped with thermoplastic electrical insulating tape equivalent to the original wire insulation rating and thickness. It shall be well lapped over the original insulation.

The eighth paragraph is revised to read:

All splices in junction boxes and handholes shall be taped and sealed with an electrical coating. Tape splice insulation shall consist of thermoplastic electrical insulating tape equivalent to the original wire insulation rating and thickness. It shall be well lapped over the original insulation and moisture resistant electrical coating shall be applied and allowed to dry. Two layers of thermoplastic tape will then be applied, followed by a second layer of moisture resistant electrical coating.

The ninth paragraph is revised to read:

Illumination cable in light standards shall be #10 AWG USE or "Pole and Bracket" cable, as specified in Section 9-29.3(2)D of the Standard Specifications.

The tenth paragraph is revised to read:

Fifteen (15) feet of slack cable shall be provided at the controller end of all cables terminating in the controller cabinet. A minimum of three (3) feet of slack cable shall be left at all strain poles and junction boxes.

8-20.3(10) Service, Transformer, and Intelligent Transportation System (ITS) Cabinets

The second, third, and fifth paragraphs are deleted.

8-20.3(13) Illumination Systems

8-20.3(13)A Light Standards

The sixth, seventh, and eighth paragraphs (regarding pole identification numbers) are deleted.

This section is supplemented with the following:

Conventional Base installation shall conform to the following:

The light standards shall be assembled and mounted complete on foundations perfectly straight and in good alignment. Proper leveling of the standards shall be accomplished by means of four leveling nuts that are to be employed with the anchor bolts. Standards shall be plumb within 1/50-inch per foot.

Luminaires shall be securely attached to the mast arm in a straight and level position. The luminaires shall be installed at a specified number of degrees from level if directed by the Engineer. After the poles are plumbed, grout shall be neatly placed between the pole base and the concrete. The Contractor shall form a 1/2-inch diameter weep hole in the grout. The nuts and bolts required for this foundation shall be furnished by the Contractor.

All above grade signal and streetlight infrastructure, including streetlight standards, traffic signal poles, push-button poles, cabinets, and enclosures, shall not be installed closer than three (3) feet from face of curb to the nearest part of the pole or structure and no closer than five (5) feet from fire hydrants and utility poles.

8-20.3(13)B Vacant

This vacant section is renamed and replaced with the following:

8-20.3(13)C Luminaires

This section is supplemented with the following:

All luminaires supplied by the project shall be identified with a green “H-1” label on the bottom of the luminaire. H-1 labels can be obtained at the Signal and Streetlight shop or through the Signal and Streetlight Inspector.

8-20.3(14) Signal Systems

8-20.3(14)A Signal Controllers

This section is revised to read:

The fully wired control cabinet, the controller, the MMU, and detection hardware for the cabinet shall be delivered to the City of Tacoma Traffic Signal Shop for configuration, programming, testing, and certification prior to installation. At the Contractor’s request, the City will off load the equipment. The Contractor shall notify the City 24 hours in advance of the equipment delivery.

A minimum of two weeks shall be required for the City to configure and test the cabinet and controller for each intersection. If multiple cabinets and controllers are delivered, the Contractor shall identify the sequence for configuration and allow one additional week for each additional cabinet and controller delivered.

The Contractor shall be responsible for transporting the controller cabinet from the Signal/Streetlight Shop site to the jobsite, and for installation of the cabinet and all field wiring. Field wiring shall be performed in accordance with 8-20.3(8) and as directed by City of Tacoma Signal and Streetlight personnel in the field.

8-20.3(14)B Signal Heads

This section is supplemented with the following:

For span wire installation, the red indications shall be leveled to within 1 inch for each direction as approved by the City. The height to the bottom of the lowest head shall be 17 feet, plus or minus 3 inches. Height to the bottom of the lowest four-section or five-section head shall be a minimum of 16 feet-3 inches, plus or minus 3 inches.

For span wire installation, the signal stem (drop pipe) shall be 1 to 3 feet long unless otherwise approved by the Engineer.

8-20.3(14)C Induction Loop Vehicle Detectors

Subsections 2, 4, 9, and 10 are deleted.

8-20.3(14)E Signal Standards

This section is supplemented with the following:

Unless otherwise shown in the plans, a terminal cabinet shall be installed on all new traffic signal strain poles and traffic signal mast arm standards. Where modifications to existing signal systems include replacement, addition, or modifications to existing signal head wiring, a terminal cabinet shall be added to the existing strain pole or mast arm standard.

For strain poles and mast arm poles supporting signal indications for one leg of the intersection, an 8" deep, 16" high, and 12" wide terminal cabinet shall be installed. For strain poles and mast arm poles supporting signal indications for two or more legs of the intersection an 8" deep, 24" high, and 18" wide terminal cabinet shall be installed.

Terminal cabinets shall be in conformance with 9-29.25.

Section 8-20.3(14) is supplemented with the following new section:

8-20.3(14)F Thermal, Microwave, Fish-Eye, and LED Optical Vehicle Detection

A representative from the City of Tacoma Signal and Streetlight operations shop shall be on site during all work within the signal cabinet. The Contractor shall notify the Engineer two working days in advance of work within the cabinet.

The Contractor shall install and test the detection system in accordance with the manufacturer's recommendations and these special provisions. Detection units shall be mounted and all cabling shall be in accordance with the manufacture's recommendations. The installation shall include all field equipment as well as all equipment required in the controller cabinet.

Detection unit locations as shown on the plans are approximate. Detection units shall be mounted at a sufficient height to prevent occlusion from cross traffic. Detection units shall be field adjusted as directed by the Engineer and equipment manufacturer for maximum coverage. A factory-certified representative of the equipment manufacturer shall inspect and provide a written verification that the installation has been performed in accordance with the manufacturers requirements.

The factory-certified representative of the equipment manufacturer shall supervise all testing of the equipment and shall provide written documentation showing acceptance of the testing and verification that the system is a complete, fully functional system.

All equipment shall be warranted against manufacturing defects in materials and workmanship for a period of 3 years from the date of signal turn-on.

8-20.3(17)B "As Built" Plans

This section is supplemented with the following:

These drawings shall show the routing of all underground conduits. The locations of the conduit shall be dimensioned with a precision and accuracy of 1 foot.

8-20.4 Measurement

This section is revised to read:

When a bid item is shown as a “Traffic Signal Modification at _____”, lump sum in the proposal, no specific unit of measurement will apply, but measurement will be for the sum total of all items for a complete system to be furnished and installed in accordance with approved methods, the Plans, the Special Provisions, and these Specifications.

Surface restoration or landscape replacement for areas disturbed beyond the proposed pavement and landscape areas associated with the Traffic Signal Modification, Illumination, and Traffic Signal Infrastructure shall be included in the respective lump sum price and no separate measurement shall be made. Illumination may be included in a Traffic Signal Modification.

Conduit zone bedding shall be incidental to the lump sum items and no separate measurement will be made.

Removal, relocation, and salvage of existing traffic signal equipment and signs where required shall be incidental to the lump sum items and no separate measurement will be made.

Temporary surface restoration items required for resuming pedestrian and vehicular traffic prior to final surfacing, including crushed rock with cold mix asphalt shall be incidental to the lump sum items and not separate measurement will be made. All pavement removal, replacement, and restoration shall in accordance with the City’s Standard Plan and City of Tacoma’s Right-of-way Restoration policy. All cost for this work shall be incidental to the lump sum items.

8-20.5 Payment

This section is supplemented with the following:

Traffic Signal Modification at S Yakima Avenue and S 72nd Street, Lump Sum

Traffic Signal Modification at S Yakima Avenue and S 84th Street, Lump Sum

Traffic Signal Modification at S Yakima Avenue and S 96th Street, Lump Sum

The lump sum contract price for the above listed “Traffic Signal Modification at _____”, shall be full pay for the furnishing, construction and testing of the complete electrical system, including removal of existing systems, as shown in the Plans and herein specified, excavation, backfilling, removal and replacement of asphalt pavement, installation and removal of concrete foundations, furnishing and installation of Traffic Signal poles, furnishing and installation of signal mast arm, removal and installation of vehicle signal heads, countdown pedestrian signal heads, video detection system and EVPE detector system, installation of APS style pedestrian push button assemblies, removal and furnishing and installation of traffic signal controller, removal and installation of signs, removal and installation of junction boxes, conduit, wiring, coordination with Tacoma Power for removal of existing electrical facilities and installation of new facilities, restoring facilities destroyed or damaged during construction, salvaging existing materials and making all required inspections and tests. All additional materials and labor, not shown in the Plans or called for herein and which are required to complete the electrical system, shall be included in the above listed lump sum contract prices.

END OF SECTION

8-22 PAVEMENT MARKING

(*****)

8-22.1 Description

The last sentence of the second paragraph is revised to read:

Traffic letters used in word messages shall be 8-feet high with the exception of any letters shown otherwise per the City of Tacoma standard plans.

This Section is supplemented with the following:

Green Durable Product

Green Durable Product shall be provided at locations identified on the plans such as “Bike Box” and “Bike Transition Lane” locations and as directed by the Engineer. Refer to details specified within these plans and specifications. The plastic product shall be a durable, color stable, non-slip surface.

Painted Curb is included in the Work and shall consist of painting the face and top of finished concrete curbs after curing is complete, using typical yellow or red paint per Plans or as directed by the Engineer to delineate bus zones, loading zones, and other no-parking zones.

8-22.2 Materials

The Section is supplemented with the following:

All plastic shall be MMA, Plastic Type D-1 in accordance with Section 9-34.3(4). The applied markings shall be very durable, oil and grease impervious, and provide immediate and continuing retro-reflectivity.

“Green Durable Product” materials shall meet the requirements of section 9-34.3(4) for MMA.

Materials used for curb paint shall be the same as for pavement marking paint per Section 9-34.2.

8-22.3 Construction Requirements

8-22.3(1) Preliminary Spotting

(*****)

The first two sentences are revised to read:

The Contractor shall perform preliminary spotting, layout, and verification that minimum acceptable lane widths will result from the work per the provided Plans before marking begins.

The last sentence is revised to read:

The color of the material used for spotting/layout does not necessarily need to match the color of the permanent marking so long as the color/method used by the Contractor allows the Engineer to discern which marks pertain to which permanent marking element.

8-22.3(3)B Line Patterns

(*****)

This Section is supplemented with the following:

Double Yellow Center Line - Two solid yellow lines, each 4 inches wide, separated by a 4-inch space.

Two Way Left Turn Line - A solid yellow line 4 inches wide with a broken yellow line 4 inches wide, separated by a 4-inch space. The broken pattern shall be based on a 32-foot unit consisting of a 12-foot line and a 20-foot gap. The solid line shall be installed to the right of the broken line relative to the direction of travel and for each direction of travel.

Lane Line - A broken white line 4 inches wide to delineate adjacent lanes traveling in the same direction. The broken pattern shall be based on a 32-foot unit consisting of a 12-foot line and a 20-foot gap.

Gore/Wide Line - A solid white line between and including 6 to 8 inches wide.

Dotted Extension Line - A broken white or yellow line with width matching its associated solid line. The broken pattern shall be based on an 8-foot unit consisting of a 2-foot line and a 6-foot gap.

Edge Line - A solid white line 4 inches wide used for lane delineation or bike lane delineation on the side adjacent to parking lane/area.

Bike Lane Line - A solid white line 6 inches wide that is used to delineate a bike lane adjacent to a moving traffic lane.

Bike Lane Skip Line - A broken white line 6 inches wide with the broken pattern based on an 8-foot unit consisting of a 2-foot line and a 6-foot gap. Bike Lane Skip Line is used to discontinue a Bike Lane Line in advance of right-turns at intersections or corresponding with transit stops.

Hatch or Chevron Line – A white 4-inch stripe used within bike buffer areas that is oriented at 45 degrees (for hatch line originating from the bike lane side of the buffer and extending toward the vehicle lane) or at converging 45 degree angles (for chevron marking) with the vertex positioned upstream within the middle of the buffer space and aligned in succession with the dissecting alignment of the overall space.

Crosshatch Marking – A white or yellow 24-in marking used within gore areas (either associated medians or center turn lanes) at a 45-degree orientation extending from the left-hand side of its occupied space to the right-hand side in the direction of traffic flow on the right-hand side of the occupied space.

Green Pavement Marking of Bike Conflict Areas – Bike lanes transitioning through conflict areas may be marked with a series of 24-inch wide green pavement marking with 4-inch sections of white striping at the ends of the resulting “bar” pattern that generally includes 6-foot separations and with the “bars” oriented perpendicular to the bike lane width/alignment.

All other striping and markings called for in the project shall be per WSDOT Standard Specifications.

8-22.3(3)E Installation

The Section is supplemented with the following for applying Type B material:

Effective Performance Life: When properly applied, in accordance with manufacturer’s instructions, the preformed marking materials shall be neat and durable. The markings shall remain skid resistant and show no lifting, shrinkage, tearing, roll back, or other signs of poor adhesion.

Packaging: The flexible preformed marking material, for use as transverse or bike symbols as well as legends, shall be available in flat form material up to a maximum of 2 foot width by 4 foot length. The material shall be packed in suitable cartons clearly labeled for ease of identifying the contents. Packaging shall not use plastic liners within to separate material from itself. Product packaging shall identify part number and mil thickness.

Material Replacement Provisions: Any properly applied preformed marking materials that shall smear or soften independent of pavement movement or condition within a period of one year from date of application shall be replaced by the supplier.

Installation: The preformed marking materials shall be applied in accordance with the manufacturer’s recommendations on clean and dry surfaces. New Portland concrete cement surfaces must be sandblasted to entirely remove curing compound. Marking configuration shall be in accordance with the “Manual on Uniform Traffic Control Devices,” where applicable.

New Surfaces: Preformed marking materials specified for newly paved asphalt road surfaces shall be capable of being applied as the original permanent marking on the day the surface is paved.

Fusion: The preformed marking materials shall be fusible to the pavement by means of a propane torch recommended by the manufacturer.

Technical Services: The supplier shall provide technical services as may be required.

8-22.3(3)F Application Thickness

The Section is supplemented with the following:

Green Durable Product: Approximately 4.2 Gallon mixture of Green colored MMA, hardwearing aggregate, and catalyst should cover 70-75 SF at 90 mils thickness.

8-22.3(4) Tolerances for Lines

The allowable tolerance for “Length of Line” is revised to read:

Length of Line: The longitudinal accumulative error within a 32-foot length of skip stripe shall not exceed plus or minus 1 inch.

8-22.3(6) Removal of Pavement Markings

This section is supplemented with the following:

Vacuum shrouded equipment, or other equally effective means, shall be used to contain and collect all pavement marking debris and excess water. Collected water and debris shall be disposed of off the project site in accordance with Department of Ecology or other federal, state or local regulations. The removal of raised pavement markers shall be incidental to the removal of the associated marking.

8-22.4 Measurement

The last sentence of the sixth paragraph is revised to read:

Crosswalk lines will be measured by the linear foot of marking installed.

The section is supplemented with the following:

Green Pavement Markings will be measured by the square foot of marking area installed.

Painted curb will be measured by the linear foot of curb line as “Painted Curb.”

No specific unit of measure will be applied to the lump sum bid item “Removal of Pavement Markings”

The measurement for “Plastic Sharrow Symbol” shall be the same as the measurement for “Plastic Bicycle Lane Symbol” as referenced in Section 8.22.4.

8-22.5 Payment

This section is supplemented with the following:

“Painted Curb”, per linear foot

The unit contract price per linear foot for “Painted Curb” shall be full compensation for painting the curb as directed by Engineer including any color combination.

“Plastic Line”, per linear foot

“Bike Lane Skip Line”, per linear foot

“Plastic Wide Lane Line”, per linear foot

“Plastic Crosswalk Line”, per linear foot.

“Plastic Stop Line”, per linear foot

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 8-22

“Plastic Traffic Arrow”, per each

“Plastic Traffic Letter”, per each

“Plastic Bicycle Lane Symbol”, per each

“Green Durable Product”, per square foot.

The cost for removal of pavement markings in conflict with existing markings is included with the price for installation of new pavement markings.

END OF SECTION

**9-29 ILLUMINATION, SIGNALS, ELECTRICAL
(June 14, 2021 Tacoma GSP)**

9-29.1(6) Detectable Underground Warning Tape

This section is supplemented with the following:

For electrical circuits detectable underground warning tape shall be high visibility red, with continuous legend of "Caution Electric Line Buried Below" or equal. The warning tape shall be polyethylene with a metallic backing. The polyethylene shall be a minimum 3 inches wide, 4 mils thick.

9-29.2 Junction Boxes, Cable Vaults and Pull Boxes

Unless otherwise specified, all junction boxes containing illumination and signal control cable shall be Type 1, Standard Duty with alternate 2 locking lid per state standard plan J-40.10-02.

Unless otherwise specified, all junction boxes containing interconnect cabling shall be Type 2, Standard Duty with alternate 2 locking lid per state standard plan J-40.10-02.

9-29.2(1)A2 Non-Concrete Junction Boxes

This section is deleted.

9-29.2(4) Cover Markings

The second paragraph of this section is revised to read:

Covers shall be marked or embossed with "LT" for boxes containing illumination circuits. Covers shall be marked or embossed with "TS" for boxes containing traffic signal circuits

9-29.3 Fiber Optic Cable, Electrical Conductors, and Cable

This section is supplemented with the following:

Where not otherwise specified, all wiring shall meet standard of the industry for the application employed. Wiring shall be consistent with manufacturers' recommendations and meet all applicable codes.

9-29.3(2)A Single Conductor

9-29.3(2)A1 Single Conductor Current Carrying

This section is supplementing with the following:

Service connections shall be stranded copper size AWG #6 USE unless otherwise shown in the plans. Black conductor insulation shall be used for the service and the neutral conductor shall be white. Color tape marking shall not be acceptable for the neutral conductor.

9-29.3(2)A2 Grounding Electrode Conductor

This section is supplemented with the following:

Grounding electrode conductor shall be minimum #8 AWG unless otherwise shown in the plans. When the ground is pulled through a conduit, the wire shall be insulated. Color tape marking shall not be acceptable for marking the ground.

9-29.3(2)A3 Equipment Grounding and Bonding Conductors

This section is supplemented with the following:

Equipment grounding shall be minimum #8 AWG unless otherwise shown in the plans. When the ground is pulled through a conduit, the wire shall be insulated. Color tape marking shall not be acceptable for marking the ground.

9-29.3(2)B Multi-Conductor Cable

This section is supplemented with the following:

Two-conductor through 10-conductor unshielded signal control cable, shall have stranded copper conductors, size AWG 14, and shall conform to International Municipal Signal Association (IMSA) signal cable 20-1.

9-29.3(2)F Detector Loop Wire

This section is revised to read:

The loop wire shall be IMSA 51-7, #14 AWG, encased in an orange colored HDPE jacket. Shielded loop lead-in wire shall be #18 stranded tinned-copper, twisted pair, 2 conductor cable with polyethylene insulation, conductors cabled, and shall have aluminum-polyester foil-shield furnished in 100% coverage, stranded tinned-copper drain wire and an overall chrome-vinyl jacket.

9-29.3(2)I Twisted Pair Communication Cable

This section is revised to read:

The cable for interconnect for underground installation shall be IMSA 40-2 #19 AWG 6 twisted pair, shielded, PE outer jacket or IMSA 40-4 #19 AWG 6 twisted pair, figure 8, shielded, PE outer jacket for overhead installation.

9-29.4 Messenger Cable, Fittings

This section is supplemented with the following:

Messenger cable shall be 5/16-inch, seven-wire strand messenger cables conforming to ASTM A 475, extra-high strength grade, 11,200 lbs. min. breaking strength, Class B galvanized.

All guy eye anchor rods shall be double-hub type.

Weatherheads shall be clamp-on type PVC. Where used for signal or flashing beacon conductors, the center of the wire entrance shall be cut or machined out to a

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

large diameter to accommodate entry of multi-conductors. All edges shall be smoothed to avoid chaffing.

All miscellaneous nuts, bolts, washers and fittings shall be stainless steel or brass unless otherwise noted.

All metal line hardware shall be hot-dipped galvanized in conformance with the requirements of ASTM Designation A-153. All eyebolts shall be thimble eye design cast or welded to form a solid eye.

5-strand, class B galvanized steel, pretwisted guy strand dead ends, high strength cable conforming to ASTM Designation A-475, shall be utilized at all span wire terminations. 1/2" rope wire thimbles shall be required where span wire connects to all poles or bull rings, except where thimble eye bolts are used. Span wire shall normally be installed directly pole to pole, unless otherwise directed or specified.

Strain insulators shall be installed where connecting to wood poles. Where span wire is connected to a steel or concrete pole, insulators shall not be installed. Strain insulators shall be wet process, porcelain, conforming to EEL-NEMA Class 54-2 standards for 12,000-pound ultimate strength and shall be installed 9 feet from the pole.

9-29.6 Light and Signal Standards

This section is supplemented with the following:

All light and signal standards shall be fixed base.

The head of the handhold security bolt shall be flush with the face of plate. The face plate of the handhole shall be flush with pole.

Traffic Signal Standards

Traffic signal standards shall be furnished and installed in accordance with the methods and materials noted in the applicable Standard Plans, pre-approved plans, or special design plans.

All welds shall comply with the latest AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals. Welding inspection shall comply with Section 6-03.3(25)A Welding Inspection.

Hardened washers shall be used with all signal arm connecting bolts instead of lock-washers. All signal arm ASTM F 3125 Grade A325 connecting bolts tightening shall comply with Section 6-03.3(33).

Traffic signal standard types and applicable characteristics are as follows:

Type PPB	Pedestrian push button posts shall conform to Standard Plan J-20.15 or to one of the following pre-approved plans:
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ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

1		<u>Fabricator</u>	<u>Drawing No.</u>
2		Valmont Ind. Inc.	DB01165 Rev. B
3			Sheet's 1, 2, 3 & 4 of 4
4			
5		Ameron Pole	WA15TR10-1 Rev. C and
6		Prod. Div.	WA15TR10-3 Rev. B
7			
8		Millerbernd	74514-WA PED-PPB Rev H
9		Manufacturing	Sheet's 10,11 of 33
10		Company	
11			
12	Type I	Type I vehicle signal standards shall conform to Standard Plan	
13		J-21.15 or to one of the following pre-approved plans:	
14			
15		<u>Fabricator</u>	<u>Drawing No.</u>
16		Valmont Ind. Inc.	DB01165 Rev. B
17			Sht. 1 2, 3 & 4 of 4
18			
19		Ameron Pole	WA15TR10-1 Rev. C and D
20		Prod. Div	WA15TR10-2 Rev. C and D
21			
22			
23		Millerbernd Manufacturing	74514-WA PED-FB, Rev. H
24		Company	
25			
26	Type II	Characteristics:	
27			
28		Signal arms	One Only
29			
30		Type II standards shall conform to one of the following pre-	
31		approved plans, provided all other requirements noted herein	
32		have been satisfied. Maximum (x) (y) (z) signal arm loadings	
33		in cubic feet are noted after fabricator. All luminaire arms shall	
34		be bracket style using a flange mount per City of Tacoma	
35		Standard Plan TS-07 and section 9-29.6(6)B of this	
36		specification.	
37			
38	Signal Arm		
39	<u>Length (max)</u>	<u>Fabricator-(x) (y) (z)</u>	<u>Drawing No.</u>
40			
41	65 ft.	Valmont Ind. Inc.	DB01162 Rev. B,
42			Shts. 1, 2, 3, 4 & 5 of 5
43			
44			
45	65 ft.	Ameron Pole	WA15TR3724-1 Rev. C and D
46			
47		Product Division	
48			
49	65 ft.	Millerbernd Manufacturing	74516-WA-TS-II,Rev. H

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

Company

Type III

Characteristics:

Luminaire mounting height	30 ft., 35 ft., 40 ft., or 50 ft.
Luminaire arms	One Only
Luminaire arm type	Type 1
Luminaire arm length (max.)	16 ft.
Signal arms	One Only

Type III standards shall conform to one of the following pre-approved plans, provided all other requirements noted herein have been satisfied. Maximum (x) (y) (z) signal arm loadings in cubic feet are noted after fabricator. All luminaire arms shall be bracket style using a flange mount per City of Tacoma Standard Plan TS-07 and section 9-29.6(6)B of this specification.

Signal Arm

Length (max)

Fabricator-(x) (y) (z)

Drawing No.

65 ft.	Valmont Ind. Inc.	DB01162 Rev. B, Shts. 1, 2, 3, 4 & 5 of 5
65 ft.	Ameron Pole Product Division	WA15TR3724-1 Rev. C and D
65 ft.	Millerbernd Manufacturing Company	74516-WA-TS-III,Rev. H

Foundations for various types of standards shall be as follows:

Type PPB	As noted on Standard Plan J-20.15
Type I	As noted on Standard Plan J-21.10
Type II	As noted in the Plans
Type III	As noted in the Plans.

9-29.6(3) Timber Light Standards, Timber Strain Poles, Timber Service Supports

This section is supplemented with the following:

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

All timber poles shall be Class II unless otherwise specified.

Mast arms for wood poles shall be “tapered elliptical” or “tapered truss” style, of a size sufficient to be used with a luminaire weight of 48 pounds with an EPA of 1.1 square feet. Arms shall have 2-3/8 inches O.D. x 8-inch long slip fitter for mounting luminaire.

9-29.6(5) Foundation Hardware

This section is supplemented with the following:

All pedestrian pushbutton poles (Type PPB) shall be installed utilizing a Breakaway Base Connection system in conformance with WSDOT standard plan J-20.15-03. Bracket shall be sized to accommodate a standard push button pole with an outside diameter of 3.5-inches. Anchor bolt receivers shall be installed at 2-3/4-inch by 7-15/16 inch on center.

Section 9-29.6 is supplemented with the following new section:

9-29.6(6) City of Tacoma Universal Pole

Unless otherwise specified, light standards and strain poles shall be in conformance with the following City of Tacoma standard design.

Strength

Each pole and mast arm shall have adequate strength for the designated luminaire with 1.8 safety factor for maximum combined stresses using 90 mph isotach (117 mph gusts) per AASHTO specifications for structure supports for highway luminaires. Design shall be based on total loading of 50 pounds and EPA of 2.0 square feet.

Standard Bolt Spacing

30 Foot poles -- Baseplate shall accommodate 1 inch anchor bolts. The bolt circle shall be between 11 inches and 13 inches.

40 Foot Poles -- Baseplate shall accommodate 1 inch anchor bolts. The bolt circle shall be between 12.5 inches and 14.5 inches.

9-29.6(6)A Steel Strain Poles

Each pole shall be of tapered round or octagonal construction.

CLASS 1 POLE: Design for dead load tensions up to 1500 pounds

CLASS 2 POLE: Design for dead load tensions up to 2600 pounds

Class 1 poles shall have a minimum base diameter of 12-inches for octagonal poles and 12-1/4-inches for round poles. Poles shall have a minimum wall thickness of 0.3125-inches. Anchor bolts shall be 1-1/2-inch by 60-inches and shall have a spacing of 11-5/16-inches on center, on the square. It is the responsibility of the pole manufacturer to maintain proper clearance between the pole shaft and nuts for the anchor bolts.

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

Class 2 poles shall have a minimum base diameter of 13-1/2-inches for octagonal poles and 14-inches for round poles. Poles shall have a minimum wall thickness of 0.375-inches. Anchor bolts shall be 2-inch by 66-inches and shall have a spacing of 12-3/4-inches on center, on the square. It is the responsibility of the pole manufacturer to maintain proper clearance between the pole shaft and nuts for the anchor bolts

Poles shall be of single-ply construction. Multiple-ply poles shall not be allowed.

Each pole shall be of tapered round or octagonal construction. Pole taper shall be in the range of 0.13 to 0.14 in/ft.

A base plate and top casting shall be securely attached to each pole. The attachment of the base plate to the pole shall be a welded connection sufficient to develop the full strength of the pole. The base plate shall have four (4) holes which will sufficiently accommodate the specified anchor bolts for the pole class.

Pole shall be of sufficient strength to allow for the span wire to be installed to sag an amount equal to 5% of the span length.

The maximum acceptable deflection, at 30 feet above the base, is 5 inches. The specified deflection shall be at a loading condition of 1,500 pounds horizontal pull at 30 feet above the base for Class 1 Poles. For Class 2 Poles, the loading condition shall be 2,600 pounds horizontal pull at 30 feet above the base.

Structural material shall be zinc-coated by a "hot-dip" process in accordance with ASTM A123 and the final coating shall measure 0.0039 inch or more in thickness as determined by a magnetic thickness gauge. All tapped holes shall be chased after galvanizing. Hardware shall be coated in accordance with ASTM A307.

The finished pole shall be reasonably straight and free from injurious defects. If galvanizing is damaged, the maximum area to be repaired is defined in accordance with ASTM A123 Section 4.6. The maximum area to be repaired in the field shall be determined in advance by the Engineer. Repair areas damaged during construction, handling, transport or installation by one of the approved methods in accordance with ASTM A780 whenever damage exceeds 3/16 inches in width. Minimum thickness for repair shall measure 0.0039 inches.

The company shall furnish the purchaser with template prints showing spacing and size of holes in base for the anchor rods.

The material shall carry the manufacturer's standard guarantee against any defect in material or workmanship for a minimum period of one year following the date of installation. The Contractor shall submit mil test reports for all steel used in the manufacturing of strain poles and pedestals.

The Contractor shall submit a Certificate of Compliance with ASTM Standards and Specifications for galvanizing. The certificate, signed by the galvanizer, shall detail

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

galvanizing process and testing procedure to determine that galvanizing meets minimum thickness specified.

The contractor shall submit welder certification. Welders must be certified to AWS standards.

Each pole shall include the following:

1. One (1) rain-tight pole cap.
2. One (1) 4-inch by 6-1/2-inch handhole at base end with cover plate opposite to mast arm.
3. Anchor bolts shall be hot dipped galvanized steel with two (2) galvanized nuts and two (2) washers for each bolt. Only 12-inches of threaded end of the bolts must be galvanized. 1-1/2-inch diameter bolts shall have 8-inches of top thread and 2-inch diameter bolts shall have 10-inches of top thread.
4. Anchor bolts shall have threaded bottom ends to receive an anchor plate and nut. The nut shall be tack-welded to the anchor plate. Anchor plates for 1-1/2-inch diameter anchor bolts shall be 4-inch square by 1-inch thick. Anchor plates for 2-inch diameter anchor bolts shall be 6-inch square by 1-inch thick.
5. One (1) adjustable strain clamp to be mountable between 26 to 28 feet above the base. Clamp shall provide facility to attach span wire at four-quarter points.
6. Provisions for mounting a mast arm of specified length. All poles shall be supplied with one mast arm mounting flange. The centerline of the flange shall be approximately 6 inches below the top of 38-foot poles and 24 inches below the top of 30-foot poles. The flanges shall conform with the detail drawing included in the Special Provisions. Poles ordered without mast arms but with provisions for a later addition of a mast arm shall be provided with a metal cover and gasket to protect the opening being provided. The cover shall be bolted to the pole using the holes provided for fastening the mast arm.
7. One (1) two-inch coupling to receive clamp-on type aluminum weatherhead positioned at 27 feet, and no more than 45° from the location of the mast arm, unless otherwise specified.
8. One (1) 1-1/4-inch coupling for wire inlet located directly opposite the mast arm.
9. One (1) grounding lug-hole in lip of handhole for 1/2-NC brass bolt.

9-29.6(6)B Luminaire Mast Arms

Each mast arm shall have sufficient strength with a 1.8 safety factor to support a 70-pound luminaire on an 18-foot mast arm per the latest AASHTO Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

Material and workmanship shall conform to the best commercial standards of the industry.

The mast arm and its fastening shall be constructed of steel conforming to Section 9-29.6

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

Each mast arm shall support a ballast-in-head luminaire and shall provide a luminaire mounting height of approximately two (2) feet above the strain pole mounting flange.

The mast arm shall provide a horizontal extension from the center of the pole to the center of the luminaire as shown in the Plans.

The mast arm shall be of tapered construction. The luminaire end of the mast arm shall not exceed 2.375 inches O.D. for a minimum distance of 8 inches. The outside arm diameter at the pole flange shall not exceed 5.88 inches.

The mast arm shall be capable of being fastened to the mast arm mounting flange dimensioned in the detail drawing. All mounting bolt heads shall clear the weld.

9-29.10 Luminaires

This section is supplemented with the following:

Unless otherwise shown in the plans all new luminaires shall be Light Emitting Diode (LED) fixtures conforming to these specifications.

Cobra-head style luminaires and other overhead fixtures, such as shoebox style fixtures, shall be provided with utility labels. Ornamental post top fixtures shall not have utility labels. Utility labels for LED fixtures shall be green and show actual total system wattage.

9-29.10(1) Conventional Roadway Luminaires

This section is replaced in its entirety with the following:

All Conventional Roadway Luminaires shall be LED meeting the following requirements:

1. Applicable Standards:

- a. American National Standards Institute (ANSI) C78 and C136
- b. Electrical and Electronics Engineers (IEEE) C62
- c. Illuminating Engineering Society of North America (IESNA or IES)
- d. Underwriters Laboratories (UL)

2. General:

- a. Luminaire shall be UL Listed
- b. Luminaire shall be listed as a Qualified Product on one of the following lists:
 - i. Energy Star
 - ii. Design Lights Consortium
 - iii. Lighting Design Lab
- c. LED light source and driver shall be compliant with the requirements of the European Union (EU) Restriction of Hazardous Substances (RoHS) Directive.
- d. Luminaire shall have an external label per ANSI C136.15.
- e. Luminaire shall have an internal label per ANSI C136.22.

3. Luminaire Performance:

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

- a. Operating Temperature Range: -4 F to +122 F
- b. Correlated Color Temperature: (CCT)
 - i. Residential- 3000K Nominal
 - ii. Arterials - 4000K Nominal
- c. Calculated Lumen Maintenance Factor (LMF): 100,000 hours or more (L70 at 25°C/77°F) in accordance with IESNA TM-21 and IESNA LM-80
- d. Color Rendering Index (CRI) : >70
- e. Light Distribution per IES Handbook: Best fit to meet design criteria
- f. Minimum Efficacy: 80 Lumens/Watt
4. Power Supply and Driver Performance:
 - a. Input Voltage: Auto-sensing 120 to 277 VAC 50/60HZ
 - b. Power factor: >0.90
 - c. Drive current maximum of 1.0A
 - d. Total harmonics distortion at full power at specified voltage: <20%
 - e. Surge Suppression Protection 10kV Minimum (IEEE/ANSI C62.41.2)
 - f. Replaceable surge module
 - g. Interference FCC 47 CFR part 15/18, Class A
 - h. Driver life >100,000 hours
 - i. Dimming: 0-10V DC
5. Lighting and Dimming Controls:
 - a. The luminaire shall be provided with a 7-pin terminal locking type photoelectric control mounting receptacle in accordance with ANSI C136.10 and ANSI C136.41.
 - b. Photocell receptacle dimming contacts shall be factory connected to driver dimming leads (violet and gray) per ANSI C136.41.
6. Luminaire Housing and Door:
 - a. The luminaire housing shall be cast or extruded aluminum. All hardware shall be stainless steel.
 - b. Cast housing components shall have a light gray polyester powder coat finish. Extruded components shall be anodized. Finish shall meet the requirements of ANSI C57.31, latest revision.
 - c. The power-door shall be fabricated from either aluminum or a UV resistant polymer.
 - d. The door shall be easily removable and shall allow for tool-less entry.
7. Slipfitter and Vibration Resistance:
 - a. Slipfitter shall be capable of accepting a 1-1/4" through 2" IP pipe tenon (1-5/8" to 2-3/8" OD) with maximum allowable insertion lengths of 7-1/2" and 10" respectively in accordance with Table 2 of ANSI C136.3, latest revision.
 - b. The Slipfitter shall have provisions for clamping the luminaire securely to the tenon and for leveling $\pm 5^\circ$ with respect to horizontal.
 - c. Luminaire shall be certified to ANSI C136.31 3G bridge and overpass vibration standards with 4-bolt configurations.
8. Ingress Protection:
 - a. The luminaire components shall have minimum moisture rating as specified in IEC 60529, with the ability to shed water from inside the housing(weep holes), and designed to minimize water collection and icing.

- b. Internal Components: IP66
- c. Enclosure: IP65
- 9. Terminal and Grounding Block:
 - a. Components shall be pre-wired to the terminal board requiring only supply power connections to clearly identified terminals.
 - b. The terminal board shall be located so that there is adequate tool-less access to accommodate user wearing electrical gloves to connect the supply leads.
- 10. Manufacturer Warranty:
 - a. 10 Year Minimum including power driver and LED chips.

9-29.10(1)A Luminaire Classifications

The City of Tacoma has established five (5) classes of LED Conventional Roadway with specific design criteria to ensure long-term lighting continuity. Luminaires are divided into classes based on function, typical use and historical High Intensity Discharge (HID) equivalents. Current classes are 100WEQ, 200WEQ, 250WEQ, 400WEQ, and RES-45. Each conventional luminaire installed shall meet the design criteria of one of these five luminaires.

Design assumptions and criteria listed for each luminaire classification may not reflect the actual conditions on the project. The design assumptions and criteria identified are only to be utilized to determine luminaire equivalency, such that another luminaire meeting the same criteria can be used to replace a failed unit without a complete redesign of the entire system.

Equivalence will be determined as follows:

1. The City of Tacoma will use Lighting Analysts AGI32 lighting software program for determination of equivalence using the design assumptions and criteria identified for each class of luminaire.
2. The roadway optimizer will be used to evaluate the performance criteria in all cases, except for the Res-45 class luminaire, where model view will be utilized to calculate the photometrics.
3. Proposed fixtures may not be tilted, rolled, or spun to meet the criteria.
4. All calculations shall be to the 100th. Rounding will not be permitted.
5. A copy of the published IES photometric file and BUG (Backlight, Uplight, and Glare) Rating shall be provided as a part of product submittal.
6. It is recognized that there are an infinite number of design variables and it is not practical to create a published IES photometric file and BUG rating for each combination. In those cases where the wattage is reduced to meet the design criteria, the base IES photometric file for the higher wattage configuration shall be used as follows:
 - a. Where no IES photometric file exists for the specific configuration, all information required to allow the City to duplicate the results and assure that the fixture meets the criteria must be provided.
 - b. When reducing the system wattage, the BUG rating of the base IES photometric file must be utilized, but may be scaled based on IES LM-79.
 - c. For modified fixtures, the City may require that a representative fixture be provided prior to acceptance. The City reserves the right to have

an independent NVLAP approved lab perform an IES LM-79 report for verification of the output for the submitted fixture. A 10 percent margin of error will be allowed in the analysis and comparison of the actual test results. Failure to meet the photometrics within the allowance may be cause for rejection.

Full design assumptions and design criteria for each of the five luminaire classes can be found at the end of this section. Excessive glare or light trespass onto private property is not acceptable. Typical usage for luminaire classes:

- 100WEQ Luminaires are typically installed along residential roadways at a height of 25 to 30 feet. 100WEQ Luminaires have a long and narrow light distribution to fit a typical residential road.
- 200WEQ Luminaires are typically installed along local classified arterial roadways and along arterials with lower pedestrian conflicts. 200WEQ Luminaires are typically installed at a height of 30 feet and will have a slightly wider distribution to cover the additional width.
- 250WEQ Luminaires are typically installed along collector to minor classified arterial roadways. 250WEQ Luminaires can be installed at a height of 30 feet or 40 feet depending on pedestrian conflict level, road width, and lighting levels required.
- 400WEQ Luminaires are typically installed along principal classified arterial roadways or areas where a higher pedestrian conflict exists. 400WEQ Luminaires are typically installed at a height of 40 feet, often installed on both sides of the roadway, in a staggered pattern to adequately light the full roadway width.
- RES-45 Luminaires are typically installed at residential street intersections or for cul-de-sacs. For residential intersections, these lights are typically installed on one corner of the intersection at a 45 degree angle to the traveled ways. The light distribution is designed to provide illumination for the intersection, but not create unacceptable light trespass on adjacent properties.

9-29.11 Control Equipment

9-29.11(2) Photoelectric Controls

This section is revised to read:

The photoelectric control shall be the twistlock type and the light sensitive element shall be a solid state photo diode. The control shall be designed to turn on at 2.6 foot-candles (+/- 20%) and turn off at 2.6 foot-candles (+/- 20%). The lighting control shall not drift by more than 1 per cent over a 10-year period.

The output control relay shall be electro-mechanical. The time delay for both turn on and turn off shall be a minimum of one second and maximum of 5 seconds. The output relay shall be rated 1000 watts incandescent or 15 amps inductive load. The contacts shall be normally closed.

The lighting control shall have a built in metal oxide varistor (MOV) rated a minimum of 160 joules for lightning and transient protection. The control shall also have secondary zener diode and transient filter. The relay shall be suitable for operation on 240 volt, 60 hertz electrical circuits.

Dimensions shall conform to ANSI specifications for twistlock photocells.

9-29.12 Electrical Splice Materials

9-29.12(1) Illumination Circuit Splices

This section is revised to read:

Splices and taps shall be made with solderless crimp connectors on underground and overhead circuits to securely join the wires both mechanically and electrically. Splices shall be sealed in accordance with 8-20.3(8).

Thermoplastic Electrical Insulating Tape

Electrical tape shall be made by the same manufacturer and compatible with the electrical coating utilized to form a complete system that both insulates and protects the splice. Electrical tape shall be based on polyvinyl chloride (PVC) and/or its copolymers and have a rubber-based, pressure-sensitive adhesive. The tape shall have a voltage rating of 600V (UL510). The tape shall be 7 mils thick, and be UL Listed and marked per UL Standard 510 as "Flame Retardant, Cold and Weather Resistant." The tape shall be resistant to abrasion, moisture, alkalies, acids, corrosion, and varying weather conditions, including ultraviolet exposure. The tape must be applicable at temperatures ranging from 0°F through 100°F (–18°C through 38°C) without loss of physical properties. The tape shall have an operating temperature up to 220°F (105°C). The tape shall be classified for use in outdoor environments. The tape shall be compatible with synthetic cable insulations, jackets and splicing compounds. The tape will remain stable and will not telescope more than 0.1 inches when maintained at temperatures below 120°F (50°C).

Moisture Resistant Electrical Coating

Electrical Coating shall be made by the same manufacturer and compatible with the vinyl electrical tape utilized to form a complete system that both insulates and protects the splice. Electrical Coating shall seal and bond the tape and be suitable for direct burial, direct water immersion, and above ground applications. Electrical coating shall be flexible when dry. Electrical coating shall consist of the solvents Acetone, Methyl Ethyl Ketone and Toluene and shall contain synthetic rubber and resin solids.

9-29.12(2) Traffic Signal Splice Material

This section is revised to read:

Induction loop splices and magnetometer splices shall include an uninsulated barrel-type crimped connector capable of being soldered. The insulating material shall be a heat shrink type meeting requirements of 9-29.

9-29.13 Control Cabinet Assemblies

This section is revised to read:

The Traffic Controller Cabinet Assembly shall be completely wired and tested to Section 5 Terminals and Facilities of the NEMA TS2 Specification, unless modified by these specifications.

Cabinets shall be compatible with both Siemens M50 and M60 series controllers.

The following submittals will be required for the review and approval by the City prior to fabrication and wiring:

1. Proposed cabinet layout diagram including shelving/rack locations. In addition, detailed diagrams shall be provided for the left side, right side, and back panels. Drawings shall be clearly labeled and dimensioned.
2. Proposed cabinet wiring diagram shall be submitted for the review and approval by the City. Wiring of cabinets shall not commence prior to City approval of the cabinet wiring plan.

All submittal comments shall be incorporated into a final set of prints and each cabinet shall be furnished to three (3) complete sets of cabinet prints. All cabinet wiring, and layout shall come on (1) E1 size sheet, multiple pages shall not be allowed. Upon request (1) CDROM or USB flash drive with AutoCAD v2018 cabinet drawing for the cabinet wiring.

9-29.13(1) Traffic Control Cabinets

Each Traffic Controller Cabinet shall meet the following general operating requirements:

1. The wired cabinet facility shall use the latest technology applicable meeting the requirements identified by these specifications.
2. The cabinet shall be designed for 16 channel operation using dual load switches. Load switches 1-4 shall be vehicle phases 1-8; load switches 5-6 shall be pedestrian phases 2, 4, 6, 8; load switches 7-8 shall be overlaps A, B, C, & D. All load switches shall be routed through a transfer relay.
3. The cabinet shall be wired for (32) channels of detection and (4) channels of Opticom™ preemption.
4. The use of PC boards shall not be allowed except in detector racks and SDLC interface panels. With the exception of detection racks, the use of plug and play modules shall not be allowed.
5. All cabinet 120VAC wires shall be 18AWG or greater, including controller "A" and MMU "A & B" cables.
6. All welds shall be free from burrs, cracks, blowholes or other irregularities.
7. The cabinet shall be UL listed.

9-29.13(1)A Cabinet Enclosures

All Cabinet enclosures shall meet the following requirements:

1. Controller cabinets that are not designated in the project plans and specifications as UPS Controller Cabinets shall be sized in accordance with NEMA P44 Controller Cabinet standards.
2. The cabinet shall meet NEMA 3R rating for enclosures.
3. The cabinet shall be fabricated from 0.125" minimum thickness 5052 H32 ASTM B209 aluminum alloy and be of clean cut design and appearance. The Cabinet shall be supplied with a natural mill finish inside and out, unless otherwise specified.
4. All exterior seams shall be manufactured with a neatly formed continuous weld construction.
5. All external fasteners shall be stainless steel. Interior cabinet welds shall be continuous for all lap and butt welds. Intermittent welds or silicone adhesive shall not be accepted in place of a weld for weather-tight penetrations. Pop rivets shall not be allowed on any external surface.
6. The cabinet shall be designed for mounting on a concrete pad with anchor bolts and typical flanges inside the cabinet. The cabinet base shall have continuously welded interior mounting reinforcement plates with the same anchor bolt-hole pattern as the footprint dimensions.
7. Unless otherwise approved by the Engineer, there shall be a minimum ten (10) inch vertical clearance above the front half portion of the base area to provide a clearance for conduit and cable entering the cabinet.
8. The cabinet shall be double-flanged where it contacts cabinet doors.
9. The top of the cabinet shall be sloped down 1" towards the rear to facilitate water runoff. The roof shall be sloped at a 90° angle at the front of the cabinet. Lesser slope angles are not allowed.
10. The cabinet shall be equipped with "C" channel rails welded to the interior of the cabinet such that panels may be mounted to the interior of the cabinet without drilling through the outer cabinet. The "C" channel rails shall be sufficient in strength to accommodate planned and reasonably anticipated future equipment needs. At a minimum, the cabinet shall have (2) welded on the back wall, and (4) welded on each side wall with (2) pairs on 8-inch centers. The side and back wall C channel rails shall run the entire usable height of the cabinet walls. Adjustable rails are not allowed.
11. The cabinet shall come with lifting ears affixed to the upper exterior of the cabinet. The lifting ears shall utilize only one bolt such that the ears can be reoriented.

9-29.13(1)A1 Cabinet Enclosures for UPS Systems

Controller cabinets that are designated in the project plans and specifications as UPS Controller Cabinets shall be 70" high x 44" width x 25.5" depth (nominal

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

1 dimensions) and meet the footprint dimensions as specified in Section 7.3, table 7-1
2 of NEMA TS2 standards for a Type P cabinet.

3 UPS Controller Cabinet enclosures shall meet all applicable requirements of Section
4 9-29.13(1)A and shall meet the following additional requirements:

- 5 1. The controller cabinet shall have (2) separate compartments. A Main
6 compartment and a Battery Backup System (BBS) compartment.
- 7 2. The main compartment shall be accessible from the front door and shall house
8 the cabinet load facilities and electronics. The Battery Backup System (BBS)
9 compartment shall be accessible from the side door and shall contain the UPS
10 system batteries.
- 11 3. The cabinet shall be designed such that when the UPS system inverter and ATS
12 assembly are mounted in the BBS compartment, they shall be fully accessible
13 when the front door is open.

14
15 **9-29.13(1)B Cabinet Doors and Locks**

16 Cabinet Doors and Locks shall conform to the following:

- 17 1. A hinged door shall be provided on the front of the cabinet permitting complete
18 access to the cabinet and the equipment to be contained therein.
- 19 2. Cabinet doors shall be mounted with single continuous stainless steel piano
20 hinges that run the length of the door. The hinges shall be attached via stainless
21 steel tamper resistant bolts.
- 22 3. Closed-cell, neoprene gaskets shall be bonded to the inside of cabinet doors.
23 The gaskets shall cover all areas where the doors contact the double flanged
24 cabinet housing exterior and be thick enough to provide a watertight seal.
- 25 4. Bearing rollers shall be applied to ends of door latches to discourage metal-on-
26 metal surfaces from rubbing.
- 27 5. All lock assemblies shall be positioned such that the door handle does not cause
28 interference with the key when opening the door.
- 29 6. A complete set of keys shall be supplied providing access to all doors, including
30 the front cabinet door, the cabinet side door (where applicable), the police door
31 and the generator receptacle door.

32 The front cabinet door shall meet the following additional requirements:

- 33 1. The front door of the cabinet shall be equipped with a universal lock bracket.
34 The lock core shall be a green construction core as noted in section 9-29.25.
- 35 2. A stiffener plate shall be welded to the inside of the front door to prevent flexing.
- 36 3. The front door shall have a two-position, three-point door stop that
37 accommodates open-angles at 90°, 125°, and 150°.
- 38 4. The front door handle shall be ¾" round stock stainless steel bar. Door handle
39 mechanisms shall be interchangeable and field replaceable.

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

A side door on UPS Controller Cabinets shall be provided for accessing the BBS compartment. The cabinet side door shall meet the following additional requirements:

1. The side door shall be one piece construction without any recessed compartments.
2. The side door shall have a three-position, two-point door stop that accommodates open-angles at roughly 80°, 100°, and 120°.
3. The side door shall use a recessed hexagonal socket in lieu of a door handle.

9-29.13(1)C Recessed Compartments

The front door shall contain (2) flush mount locking recessed compartments. The upper compartment shall house a police door and the lower compartment shall house a generator bypass receptacle.

1. The welds for the police compartment and the generator receptacle compartment shall be done on the outside of the front door.
2. The police door compartment shall come with a conventional police lock.
3. The generator bypass receptacle compartment shall have an integrated door slide mechanism that allows the door to be closed and locked after a generator has been connected to the internal receptacle.
4. The generator bypass receptacle compartment shall be equipped with a universal lock bracket. The lock core shall be a Green construction core as noted in section 9-29.25.
5. The locking generator bypass compartment will be used to connect a generator for operating the cabinet during loss of service line power. The generator compartment shall be capable of being closed and locked while a generator is connected. The mechanism for allowing generator cable access, while the compartment is closed, shall be an integral part of the generator bypass door, via a sliding panel that will normally be in the closed position.

9-29.13(1)D Cabinet Ventilation

Cabinet ventilation shall be provided as follows:

1. A louvered air entrance shall be located at the bottom of the front cabinet door.
2. For UPS Cabinets, a louvered air entrance shall also be provided at the bottom of the side cabinet door.
3. Louvered air entrances shall satisfy NEMA rod entry test requirements for 3R ventilated enclosures. The baffle panel that holds the fan assemblies shall be sealed on the interior of the cabinet.
4. The cabinet shall come with (2) three-stage, multi-ply progressive density polyester, disposable air filter; and the filter performance shall conform to listed UL 900 Class 2 and shall conform to ASHRAE Standard 52.1. The filter shall be secured to entrance on main door by two (2) horizontally-mounted restraints.
5. The cabinet shall be provided with two (2) finger safe fans mounted on the right and left sides of the cabinet plenum, and shall be thermostatically controlled.

1 Fans shall have a rating of 100 CFM and the thermostat setting to allow variable
2 turn-on between 90 degrees and 140 degrees Fahrenheit. The fan motor shall
3 use ball-bearings. This unit shall be fitted with an electrical noise suppressor.
4 The safe touch thermostat and power terminal block(s) shall be din rail mounted
5 on the cabinet plenum.

6

7 **9-29.13(1)E Cabinet Shelving**

8 Cabinet Shelving shall be provided as follows:

- 9 1. The cabinet shall have two (2) aluminum 0.75-inch shelves that span the width of
10 the cabinet. Shelves shall be double beveled 10" deep and reinforced with
11 welded V channel, fabricated from 5052-H32 0.125-inch thick aluminum with
12 double flanged edges rolled front to back. Slotted holes shall be inserted every
13 7" for the purpose of tying off wire bundles.
- 14 2. A slide-out computer shelf 16" length by 12" width by 2" depth shall be installed
15 underneath the bottom equipment shelf. The shelf shall be mounted just left of
16 center so that controller cables will not interfere with the operation of the shelf
17 when equipment is installed. The computer shelf shall have a hinged cover that
18 opens from the front and shall be powder-coated black. The computer shelf shall
19 be fully retractable under the bottom equipment shelf. When fully extended, the
20 computer shelf shall hold a minimum of 50lbs and shall automatically secure in
21 place, mechanically, with a tool-less release mechanism.
- 22 3. For UPS Controller Cabinets, the BBS compartment shall come with (1) 14.25" x
23 7.75" flanged shelf designed to hold the batteries. In the UPS configuration, the
24 main cabinet shall come with a third shelf that runs the entire width of the cabinet
25 above the BBS compartment.
- 26 4. The cabinet shall have one (1) aluminum 0.75 inch shelf measuring 20.90 inches
27 wide by 10.75 inches deep next to the load bay and mounted 9.25 inches from
28 the bottom of the cabinet. Shelf shall be double beveled and reinforced with
29 welded V channel, fabricated from 5052-H32 0.125-thick aluminum with double
30 flanged edges rolled from front to back.

31

32

33

34 **9-29.13(2) Wiring**

35 All wiring within the cabinet shall be neat and firm. All cabinet wire shall be amply
36 rated for the function intended and shall include the use of terminal and suitable
37 identification labels.

38

39 Connectors and harnesses shall be provided as defined in the latest NEMA TS 2
40 standard. Connector A & B shall be supplied for the monitor unit. In addition, the
41 cabinet shall be wired with a standard 55-pin NEMA TS 1 Connector A.

42

43 Wire for harnesses shall conform to MIL-W-16878E Type B, and shall be rated to
44 600 volt, 105 degree Celsius. Wire shall be 22 gage, 19 strand. Wires shall be
45 connected to the heads in the form of crimp-pinned connections. Solder lugs shall

not be allowed. Connectors shall conform to MIL-C-26482 Series 1. Cables shall be covered with nylon expandable sleeving. Spiral wrap shall not be used. Termination points of the harnesses shall be accessible to the technician without requiring the back panel to be dropped. Unused harness wires shall be tied to the furthest location on the front of the back panel and shall be capped off.

Wires other than harnesses for the monitor and controller shall be THHN, rated at 600 volt, 105 degree Celsius, and shall be a minimum of 22 AWG.

Non insulated connectors shall be utilized for all connections to the Detector Input Terminal Strip.

9-29.13(3) Electrical Design

9-29.13(3)A Load Bay

The design of the load-bay shall conform to NEMA TS2 Section 5, Terminals and Facilities, unless modified herein. The load bay shall be the termination point for the controller unit (CU) CU 55-pin TS1 MSA cable, the (MMU) MSA & B cables, bus interface units (BIU) 1 and 2, and field terminal facilities. The terminal facilities layout shall be arranged in a manner that allows all equipment in the cabinet and all screw terminals to be readily accessible by maintenance personnel.

The load bay shall be fully wired and meet the following requirements:

1. The load bay assembly shall be constructed of smooth finished aluminum, with a minimum nominal thickness of 0.125 inches (1/8 inch). The dimensions shall not exceed a maximum height of 16 inches and a maximum width of 18 inches including wiring bundles. The load bay assembly shall be mounted between 7-inches and 9-inches above the bottom of the cabinet.
2. The load bay assembly (panel) shall be hinged and capable of folding down to allow full access to all back-panel wiring. All solder terminals shall be accessible when the load bay is rolled down. The assembly shall be able to roll down without requiring other components, cables, or switches to be removed. The panel shall be constructed, and wiring shall have sufficient slack, such that folding down the back panel shall not interfere with the operation of the traffic signal while in service.
 - (1) All wire shall enter the lower edge of the panel to facilitate folding down back panel. The controller (CU) and malfunction management (MMU) cables shall be routed through the back of the load-bay so that they will not be subject to damage during load-bay roll down.
 - (2) The load bay shall be designed so that all other cabinet screw terminals are accessible without removing cabinet electronics.
 - (3) The panel shall be able to be fully secured when in its upright position.
 - (4) The top of the load-bay panel shall attach directly to "C" channel and detach without the use of tools or hardware for roll down purposes.

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

- (5) The load bay shall be balanced such that it will not roll down when the top of the load bay is detached from the “C” channel, even when fully loaded with BIU’s, load switches, flasher, and flash transfer relays.
3. The load-bay facility shall be wired for 16 channels.
 - (1) Load switch(s) 1-4 shall be vehicle phases 1-8
 - (2) Load switch(s) 5 & 6 shall be pedestrian phases 2, 4, 6, & 8
 - (3) Load switches 7 & 8 shall be overlaps A, B, C & D
 - (4) Load switches 1-4 & 7-8 shall be routed through a flash transfer relay.
4. The following sockets will be provided:
 - (1) Minimum eight (8) dual load switch sockets spaced 1.25 inches on center.
 - (2) Eight (8) flash transfer relay sockets designed to utilize high density flash transfer relays.
 - (3) One (1) dual flasher socket.
5. Load Resistors shall be provided on a back right side panel. See section 9-29.13(3)B for more information.
6. All load switches and flasher shall be supported by a bracket extending at least ½ the length of the load switch.
7. Controller Unit (CU) Wiring: Wiring the 55-pin TS1 MSA cable shall be soldered to backside of a load bay screw-type terminal strip. All controller pins functions shall be terminated.
8. Wiring for one (1) Type-16 MMU shall be soldered to backside of a screw type terminal strip. Any used MMU functions shall be accessible from a screw terminal.
9. Two (2) bus interface rack slots for BIU’s 1 and 2 shall be part of the main panel. The main panel BIU rack shall be located in the top left corner of the load-bay placed horizontally and shall accommodate half width BIU’s.
10. BIU wire connections to the PCB shall be via two (2) 34 pin connectors. These connections shall have locking latches. BIU wires shall be soldered to the backside of a screw terminal. The load-bay shall have one (1) 120VAC relay socket.
11. The load bay shall have one (1) relay that drops the +24VDC to load switches when the cabinet is in flash.
12. The load-bay shall be silkscreened on both sides. Silkscreen shall be numbers and functions on the front side, and numbers only on the back side. The back side shall have label oriented so that labels are upright when the load bay is rolled down.
13. The field terminals shall be as follows:
Red: 1R, 2R, 3R, 4R, 5R, 6R, 7R, 8R, 2DW, 4DW, 6DW, 8DW, AR, BR, CR, DR
Yellow: 1Y, 2Y, 3Y, 4Y, 5Y, 6Y, 7Y, 8Y, 2CL, 4CL, 6CL, 8CL, AY, BY, CY, DY
Green: 1G, 2G, 3G, 4G, 5G, 6G, 7G, 8G, 2W, 4W, 6W, 8W, AG, BG, CG, DG

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

- 1
2 14. Field wiring terminations shall be per channel across the bottom of the load-
3 bay. Each channel shall have 3 terminations corresponding to the appropriate
4 phase Green/walk, Yellow/Ped clearance and Red/Don't Walk. Default wiring
5 shall be left to right vehicle phases 1-8, pedestrian phases 2, 4, 6, 8 and
6 overlap channels A, B, C, and D following the order of the load switches.
7 Field terminals shall be #10 screw terminal and be rated for 600V.
- 8 15. The cabinet shall be wired to flash for all channels. Flashing operation shall
9 alternate between the flasher circuits 1 and 3 (channels 1, 3, 5, 7, 9, 11, 13, &
10 15) and circuits 2 and 4 (channels 2, 4, 6, 8, 10, 12, 14, & 16). Changing a
11 channel from one circuit from one channel to another shall be possible
12 through the front of the load bay without tools.
- 13 16. Flash programming shall be either red, yellow, or no flash by changing the
14 programmed connector on the front of the load bay. The cabinet shall be
15 supplied with overlaps phases programmed to red flash and pedestrian
16 phases programmed to no flash.
- 17 17. The intersection shall be capable of being placed in flashing operation by the
18 conflict monitor, remote input, internal controller time clock and door switch.
19 Remote and internal controller time clock flash shall be in accordance with
20 MUTCD flash. Conflict flash shall be all-red.
- 21 18. All spare circuits shall be wired and terminated on a terminal strip and shown
22 on the wiring diagram.
- 23 19. All cable wires shall be terminated. No tie-off of unused terminals will be
24 allowed.
- 25 All wiring shall conform to NEMA TS2 Section 5.2.5 Table 5-1. Conductors shall
26 conform to military specification MIL-W-16878E, electrical insulated high heat wire,
27 type B. Conductors #14 or larger shall be permitted to be UL type THHN. Main Panel
28 wiring shall conform to the following colors and minimum wire sizes:
- | | |
|--------------------------------------|--------------------------------|
| 29 Vehicle green load switch output | 16 gauge brown |
| 30 Vehicle yellow load switch output | 16 gauge yellow |
| 31 Vehicle red load switch output | 16 gauge red |
| 32 Pedestrian Clearance load switch | 16 gauge yellow |
| 33 | |
| 34 Vehicle green load switch input | 22 gauge brown |
| 35 Vehicle yellow load switch input | 22 gauge yellow |
| 36 Vehicle red load switch input | 22 gauge red |
| 37 Pedestrian Clearance input | 22 gauge yellow |
| 38 | |
| 39 Logic Ground | 18 gauge white with red tracer |
| 40 +24V DC | 18 gauge red with white tracer |
| 41 +12V DC | 18 gauge pink |
| 42 AC+ Line | 14 gauge black |
| 43 AC- Line | 14 gauge white |
| 44 Earth Ground | 16 gauge green |
| 45 AC line (load bay) | 16 gauge black |
| 46 AC neutral (load bay) | 16 gauge white |

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

Controller A Cables – AC+	18 gauge black
Controller A Cables – AC-	18 gauge white
Controller A Cables – Earth Ground	18 gauge green
Controller A Cables – All other cables	22 gauge blue
MMU A & B Cables – AC+	18 gauge black
MMU A & B Cables – AC-	18 gauge white
MMU A & B Cables – Earth Ground	18 gauge green
MMU A & B Cables – Start Delay Relay	
Common	18 gauge black
Normally Open	18 gauge black
Normally Closed	18 gauge black
MMU A & B Cables – All other cables	22 gauge orange

Two (2) conductors will supply alternating current (AC) power to the load switch sockets. The load switch sockets shall be supplied 1-4 and 5-8 by each conductor.

The field terminal blocks shall have a screw Type No. 10 post capable of accepting no less than 3 No. 12 AWG wires fitted with spade connectors. Four (4) 12-position terminal blocks shall be provided in a single row across the bottom of the main panel. Spade lugs from internal cabinet wiring are not allowed on field terminal screws.

There shall be a plug-in bridge with (16) 3 position panel mount sockets and (16) two position plugs with screw terminals located below the flash transfer relays. These connections shall operate the flash programming between flash circuit 1 & 3 or 2 & 4. It shall be changeable from the front of the load-bay.

All load switches, flasher, and flash transfer relay sockets shall be marked and mounted with screws. Rivets and clip-mounting is unacceptable.

The power terminal blocks shall have a screw Type No. 10 post capable of accepting no less than 3 No. 12 AWG wires fitted with spade connectors. One (1) 12-position terminal blocks shall be provided vertically on the right side of the load bay. The placement of the power terminal block on any other panel shall not be allowed.

Wire size 16 AWG or smaller at solder joints shall be hooked or looped around the eyelet or terminal block post prior to soldering to ensure circuit integrity. All wires shall have lugs or terminal fittings when not soldered. Lap joint/tack on soldering is not acceptable. All soldered connections shall be made with 60/40 solder and non-corrosive, non-conductive flux. All wiring shall be run neatly and shall use mechanical clamps and conductors shall not be spliced between terminations. Cables shall be sleeved in braided nylon mesh and wires shall not be exposed.

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

All wires terminated behind the main panel or on the back side of other panels shall be SOLDERED. No pressure or solder-less connectors shall be used. Printed circuit boards shall not be allowed.

9-29.13(3)B Side Panels

Side panels shall be mounted on “C” channels as specified herein. All panels shall be smooth finished aluminum sufficient in size and thickness for the intended purpose and anticipated equipment required. Side panels shall be no smaller than 16 gauge and no larger than 12 gauge. Side panels shall be mounted no closer than 13” from the rear of the cabinet and no closer than 2” from bottom of cabinet.

The Back Left (BKLT) side panel(s) shall contain the following:

1. BKLT/PSIP – Power Supply Interface Panel
 - a. 12-position, double row, high barrier block with #8/32 slotted brass screws
 - b. See Section 9-29.13(3)B1 for additional requirements
2. BKLT/SDLC – SDLC Interface Panel
 - a. 12-port SDLC terminal
 - b. See Section 9-29.13(3)B2 for additional requirements
3. Additional blank panels are not required for vacant space in the back left of the cabinet.

The Front Left (FRLT) side panel(s) shall contain the following:

1. FRLT/VDIP – Video Detection Interface Panel
 - a. See Section 9-29.13(3)B3 for requirements
2. FRLT/DP – Detection Panel
 - a. Vehicle Detection: 64-position, double row, din mounted, screw type terminal block.
 - b. Emergency Vehicle Preemption: 12-position, double row, din mounted, screw type terminal block
 - c. Pedestrian Detection: 8-position, double row, high barrier block with #8/32 slotted brass screws
 - d. Pedestrian Returns: Two (2) 8-position, single row, high barrier block, with #8/32 slotted brass screws
 - e. Isolated Neutral Buss: 24-position, standard copper grounding buss bar suitable for #14 through #4 cu.
 - f. Ground Buss: 16-position (minimum), standard copper grounding buss bar suitable for #14 through #4 cu.
 - g. See Section 9-29.13(3)B4 for additional requirements
3. Blank aluminum spare panels shall be installed in the available space on the front left side of the cabinet.

The Back Right (BKRT) side panel(s) shall contain the following:

1. BKRT/PS - Power strip convenience outlets as identified by these specifications. Reference 9-29.13(3)C and 9-29.13(3)B5.
2. BKRT/SLP – Supplemental Load Panel
 - a. Din-Mounted thirty-two (32) position disconnect screw type terminal block.

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

- b. Thirty-two (32) 2k-OHM, 12 watt resistors wired to back panel.
- c. See section 9-29.13(3)B8 for more information.
3. Additional blank panels are not required for vacant space in the back right side of the cabinet.

The Front Right (FRRT) side panel(s) shall contain the following:

1. FRRT/PP - Power Panel
 - a. See Section 9-29.13(3)B5 for additional requirements
2. FRRT/CIP - Communication Interface Panel
 - a. See Section 9-29.13(3)B6 for additional requirements
3. FRRT/Generator Panel
 - a. See section 9-29.13(3)B7
4. Blank aluminum spare panels shall be installed in the available space on the front right side of the cabinet.

9-29.13(3)B1 Power Supply Interface Panel

The power supply interface panel shall be mounted on the upper back left wall of the cabinet above the top shelf. The power supply interface panel shall include terminations for all the cabinet power supply inputs and outputs. It shall have a protective plastic cover.

9-29.13(3)B2 SDLC Interface Panel

All SDLC cables shall be terminated on both ends, securely terminated to the SDLC interface panel with screw type connection and professionally routed in the cabinet interior to easily reach the controller, malfunction management unit, BIUs. All SDLC connectors shall be fully populated with 15 pins each. SDLC cables shall be tie wrapped in a neat and orderly way.

9-29.13(3)B3 Video Detection Interface Panel

The video detection interface panel shall be the single point interface for video power and coax cabling. The panel shall have (6) individual 1 amp circuit breakers so that individual cameras can be replaced in the field without disrupting the entire video detection system, a (10) position terminal block with #8/32 screws to provide termination for 120VAC and camera 120AC line and 8-position copper neutral and ground buss bars with raised slotted & torque style screws. The AC terminal block shall be covered with a Plexiglas cover.

A coax surge arrestor shall be installed for each coax based video detection camera identified in the project plans and specifications. The coax surge arrestor shall meet or exceed the manufacturer's recommendations for the cameras installed. Surge arrestors are not required to be installed in the cabinet when a coax based detection system is not identified in the plans and specifications.

9-29.13(3)B4 Detection Panel

The detection panel shall be mounted on the left side of the main cabinet compartment below the bottom shelf. The detection panel shall support (32) channels of vehicle detection, (4) channels of emergency vehicle preemption, (4) channels or pedestrian detection with (2) terminal screws per channel and (8) pedestrian returns on a single panel. The pedestrian call terminal block shall be (2) single row terminals. They shall be connected by removable buss bars. The loop wires shall be a 22AWG twisted pair. One of the twisted pair wires of all colors shall have a white tracer and land on the second position terminal of each loop. The emergency preempt wires shall be color coded as follows. +24VDC orange, preempt inputs yellow and ground blue. The auxiliary vehicle preemption shall be white with a yellow tracer. All wiring for the detection panel shall enter the terminal block from the left and provide sufficient room to close the cabinet door.

The panel shall also include a (24) position solid copper neutral buss bar with raised slotted & torque style screws and a (16) position minimum solid copper ground buss bar with raised slotted & torque style screws. They shall be mounted vertically at the bottom of the panel.

9-29.13(3)B5 Power Panel

The power panel shall handle all the power distribution and protection for the cabinet and shall be mounted in the bottom right side of the cabinet. All equipment shall be mounted on an appropriately sized silkscreened aluminum panel and include at a minimum the following equipment:

1. A 30-amp main breaker shall be supplied. This breaker shall supply power to the load bay, load switches, controller, MMU, power supply, detector racks, power strip and auxiliary panels. Breaker shall be din rail mounted.
2. A 15-amp auxiliary breaker shall supply power to the fan, cabinet lights and GFI. Breaker shall be din rail mounted.
3. The surge protection device (SPD) shall consist of a modular surge protector for the AC line, another modular surge protector for the AC neutral and ground. There shall also be a radio interference suppressor (RIS). All units shall meet the following requirements.
 - a. Devices shall be Open Type 1 UL Listed 1449 4th Edition.
 - b. The surge components are all Din-Rail mountable.
 - c. If a failure is to occur the components are hot swappable
 - d. An indicator flag will show that the component has failed. No more guessing or testing.
 - e. The Surge component has a contact closure that can notify you if a failure occurs on the unit.
 - f. No bolts or wires to remove to replace the unit.
 - g. The unit is Safe Touch. No need for a plastic protective cover.
4. A normally open, solid state relay rated for 50-amp minimum for the load switch power. (No Mercury Contactors shall be allowed.)
5. One see-through Plexiglas cover to protect maintenance personnel from AC line voltages.

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

6. One (1) 19-position standard solid copper neutral buss bars with raised slotted & torque style screw heads suitable for #14 through #4 cu.
7. Two (2) 19-position, standard solid copper ground buss bars with raised slotted & torque style screw heads suitable for #14 through #4 cu.
8. Line side AC Power Terminal, 3-position, double row. Power Terminal shall be a dead-front type rated at a minimum of 300V, 50 amp and suitable for #6 cu.
9. The neutral buss bar, the ground buss bars, and the line side power terminal shall be installed at the bottom of the power panel. The buss bars shall be installed horizontally and the terminal shall be installed with the same orientation such that the wires coming into the cabinet can be easily connected from the bottom of the cabinet. The power terminal shall be installed to the right of the ground and neutral bus bars.

All circuit breakers shall be Square D, Siemens, GE, Eaton/Cutler Hammer, or Engineer approved equal.

9-29.13(3)B6 Communication Interface Panel

There shall be (2) 12-position, double row, high barrier terminal blocks, with #6/32 slotted brass screws on the left bottom side of the spare panel on the right side wall of the cabinet. The Communication Interface Panel height shall be from the top of the Power Panel to the top of the "C" Channel.

9-29.13(3)B7 Generator Panel

There shall be a Line side AC Power Terminal, 3-position, double row. Power Terminal shall be a dead-front type rated at a minimum of 300V, 50 amp and suitable for #6 cu. The AC power terminal shall be covered with a **see-through Plexiglas** cover to protect maintenance personnel from AC line voltages. The Generator Panel shall be mounted directly below the Power Panel.

9-29.13(3)B8 Supplemental Load Panel

There shall be a supplemental load panel with din mounted disconnect screw type terminal block and resistors. The disconnect terminal shall be wired to the green and yellow outputs for each phase and allow current through the resistor when the circuit is completed.

9-29.13(3)C Convenience Outlets

The cabinet shall be wired with (1) 120 VAC convenience outlet with a ground fault interrupter (GFI) and (1) 120 VAC power strip without ground fault interrupters. The ground fault outlet (GFI) shall be mounted on the right side of the main compartment on or near the power panel. The power strip shall be near the top shelf of the main compartment in the upper left corner of the cabinet and the wiring shall be neatly secured. No outlets shall be mounted on the door. The non-GFI power strip shall be on a separate circuit from the GFI outlet, and provide a minimum of six (6) outlets. The power strip shall be fed through the transient voltage suppressor located on the cabinet power panel.

9-29.13(3)D Cabinet Illumination

Two LED light strips shall be provided for cabinet illumination. One shall be mounted to the top front of the cabinet interior, and shall be rated at a minimum of 475 lumens. A second LED light to illuminate the load bay area and shall be mounted below the rollout drawer (computer shelf), and shall be rated at a minimum of 240 lumens. The light shall be attached so that it remains stationary when the drawer is extended. A door switch shall be wired so as to allow both lights to operate only when the door is open.

9-29.13(3)E Generator Bypass Compartment and Cable

Inside the generator compartment there shall be a silkscreened panel housing:

1. 30A / 125V flanged inlet receptacle capable of accepting a standard 30 amp generator plug. The receptacle shall be appropriate for an extra heavy duty industrial application meeting the following requirements:
 - a. Backwired terminations for ease of installation
 - b. NEMA L5-30P
 - c. Listed to UL 498
 - d. Fed Spec: W-C-596
 - e. Certified to CSA C22.2 No. 42
 - f. Housing/Flange: Nylon
 - g. Terminal Retainer: Clear Polycarbonate
 - h. Blades: Brass
 - i. Terminal Screws: #10-32 Brass (Phillips / Slotted / Robertson)
 - j. Terminal Clamp: Cold Rolled Steel – nickel plated
 - k. Assembly Screws: Steel - nickel plated
 - l. Mounting Screw: Nickel plated brass
 - m. Electrical: Current Interrupting Certified for current interrupting at full rated current
 - n. Dielectric Voltage: Withstands 2,000V minimum
 - o. Mechanical: Cord Grip Accommodation #16 AWG - #8 AWG solid or stranded copper wire only.
 - p. Terminal Identification: In accordance with UL 498
 - q. Flammability: HB or better per UL94/CSA 22.2 No.0.17
 - r. Moisture Resistance: IP20 Suitability
 - s. Operating Temperatures: Maximum Continuous 75°C. Minimum - 40°C (w/o impact)
2. A 50A, 2 pole, 4 contact cam switch with split 120VAC line and neutral feeds. The switch shall be a break before make type.
3. (2) LED lamps with sockets. One LED shall be illuminated when the cabinet has service line power available and the other when the cabinet has generator power available. All LED's shall be field replaceable without putting the intersection in flash and shall carry a 5 year manufacturer warranty.

All wiring to the generator bypass compartment shall be contained in a single cable bundle. The cable shall connect to the backside of the electrical components and shall only be accessible from the inside of the cabinet front door. All electrical components on the inside of the front door that carry AC voltage shall be covered by

a see-through plexi-glass cover. The generator bypass cable shall terminate at the same power panel location as service line voltage.

9-29.13(3)F Police Panel

Behind the police panel door there shall be switches for use by emergency personnel. The wiring for these switches shall be accessible when the auxiliary panel is open.

The following switches shall be included:

1. **Flash Switch:** There shall be a switch for the police that puts the cabinet into flashing operations. The switch shall have two positions, "Auto" (up) and "Flash" (down). The "Auto" position shall allow normal signal operation. The "Flash" position shall immediately cause all signal displays to flash as programmed for emergency flash and apply stop time to the controller. When the police flash switch is returned to "Auto", the controller shall restart except when the MMU has commanded flash operation. The effect shall be to disable the police panel switch when the MMU has detected a malfunction and all controller and MMU indications shall be available to the technician regardless of the position of the police flash switch. The switch shall be a general-purpose bat style toggle switch with 0.688-inch long bat.
2. **Signals On/Off Switch:** There shall be a switch that renders the field signal displays electrically dead while maintaining controller operation for purpose of monitoring controller operations. The switch shall be a general-purpose bat style toggle switch with 0.688-inch long bat.

9-29.13(3)G Auxiliary Switch Panel

The cabinet shall include an auxiliary switch panel mounted to the interior side of the police panel compartment on the cabinet front door. The panel shall be secured to the police panel compartment by (2) Philips head screws and shall be hinged at the bottom to allow access to the soldered side of the switches. Both sides of the panel shall be silkscreened. All of the switches shall be protected by a hinged see-through Plexiglas cover.

The following switches shall be included:

1. **Controller ON/OFF Switch:** There shall be a switch that renders the controller and load-switching devices electrically dead while maintaining flashing operations for purpose of changing the controller or load-switching devices. The switch shall be a general-purpose bat style toggle switch with 0.688-inch long bat.
2. **Signals ON/OFF Switch:** There shall be a switch that renders the field signal displays electrically dead while maintaining controller operation for purpose of monitoring controller operations. The switch shall be a general-purpose bat style toggle switch with 0.688-inch long bat.
3. **Stop Time Switch:** There shall be a 3-position switch labeled "Normal" (up), "Off" (center), and "On" (down). With the switch in the "Normal" position, a stop

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

timing command shall be applied to the controller by the police flash switch or the MMU (Malfunction Management Unit). When the switch is in its “Off” position, stop timing commands shall be removed from the controller. The “On” position shall cause the controller to stop time. The switch shall be a general-purpose bat style toggle switch with 0.688-inch long bat.

4. **Technician Flash Switch:** There shall be a switch that places the field signal displays in flashing operation while the controller continues to operate. This flash shall have no effect on the operation of the controller or MMU. The switch shall be a general-purpose bat style toggle switch with 0.688-inch long bat.

5. **Light Switch:** There shall be a switch that turns cabinet lighting off with the main door open. The switch shall be a general-purpose bat style toggle switch with 0.688-inch long bat.

9-29.13(4) Auxiliary Equipment

9-29.13(4)A Traffic Signal Controller

Traffic Signal Controller shall be a Siemens Controller, EPAC M62 with an ATC Communications Module. The CPU operating system shall be Linux. The Contractor shall contact the City of Tacoma Traffic Signal Shop at 253-491-5287 to obtain the current firmware version to be utilized.

Siemens M62 traffic signal controllers operating a Pedestrian Hybrid Beacon (HAWK Signal), must be configured by the manufacturer for operation of a pedestrian hybrid beacon. The contractor/vendor shall configure and test the operation of the controller and malfunction management unit prior to delivery to the City of Tacoma Signal Shop.

9-29.13(4)B Malfunction Management Unit (MMU)

The cabinet shall come with a Malfunction Management Unit (MMU). The cabinet shall come with a (MMU) that meets all the requirements of NEMA TS2-2003 while remaining downward compatible with NEMA TS1. It shall have (2) high contrast LCD displays and an internal diagnostic wizard. It shall come with a 10/100 Ethernet port. It shall come with software to run flashing yellow arrow operation. The MMU shall be an Eberle Design, Inc. (EDI) model MMU2-16LEip. Contractor shall provide a compatible TS2 program card onboard memory.

MMUs monitoring a Pedestrian Hybrid Beacon (HAWK Signal), must be configured by the manufacturer specifically for the monitoring and operation of a pedestrian hybrid beacon. The contractor/vendor shall configure and test the operation of the controller and malfunction management unit prior to delivery to the City of Tacoma Signal Shop.

9-29.13(4)C Dual Channel Load Switches

The cabinet shall be provided with eight (8) dual channel load switches. All load switches shall be solid state circuit board type with a 2-piece aluminum case.

Separate LED indications shall be provided for the input and output side of the loads for each channel. The load switches shall be Western Systems model SSS-216.

9-29.13(4)D Dual Channel Flasher

The Cabinet shall come with one (1) dual channel flasher. The flasher shall be solid state circuit board type with a two-piece aluminum case. LED indications shall be provided for both channels. The flasher shall be Western Systems model SSF-216.

9-29.13(4)E High Density Flash Transfer Relay

The High Density Flash Transfer Relay (HDFTR) shall have a hermetically sealed cover and shall be moisture proof. The HDFTR shall be filled with dry nitrogen to protect contacts from corrosion and to prevent condensation. The HDFTR shall have a shock/impact resistant metal can cover with solid and bend proof pins. The HDFTR contacts shall be rated at 120VAC @ 10 Amp. The coil of the HDFTR shall be rated at 120VAC. The HDFTR shall have an LED indicator to display contact transfer position.

9-29.13(4)F Loop Detector Card Rack

Two (2) fully wired 8-position card racks, shall be installed. Detector racks shall be capable of using both two channel and four channel detection devices. One of the card racks shall also have the additional capacity and be fully wired for an Opticom Model 760 Card. Racks shall be secured to the detector shelf as far to the right as possible within the cabinet in such a manner as to afford easy access for maintenance, without interfering with access to any of the ports. The racks shall accommodate 4.5 inch high, 6.875 inch long, 1.12 inch wide two channel, two output per channel detector modules. Connectors shall be 44 contacts (22 each side) spaced on 0.156" centers. Each rack shall be provided with a bus interface unit (BIU). These shall meet all the requirements of NEMA TS-2 1988 standards. In addition, all BIUs shall provide separate front panel indicator LED's for DC power status and SDLC Port 1 transmit and receive status.

The (BIU)'s shall be Eberle Design, Inc. model BIU-700H, Econolite model BIU-64, Reno A&E model BIU/2, or Engineer approved equal.

The loop cabling shall be connected via a 37 pin DB connector using spring clips. The Opticom cable shall be connected via a 24 pin connector using locking latches. The power cable shall be a 6 pin connector. All power wires shall be 18AWG. The addressing of detector racks shall be accomplished via dipswitches mounted to the PCB. There shall be the capability to turn off the TS2 status to the BIU for the uses of TS1 detector equipment via dipswitches mounted to the PCB. There shall be a 34 pin connector using locking latches that breaks the output from the detector to the input of the BIU, there shall also be +24VDC and logic ground on this connector. All racks shall have space at the bottom front for labeling. All racks shall be designed for horizontal stacking. Separate racks for detection and preemption are not allowed.

9-29.13(4)G Detector Power Supply

The cabinet shall come with a shelf mounted cabinet power supply meeting at minimum NEMA TS 2-2003 (R2008) standards. It shall be a heavy duty device that provides +12VDC at 5 Amps / +24VDC at 3 Amps / 12VAC at 0.25 Amp, and line frequency reference at 50 mA. The power supply shall provide a separate front panel indicator LED for each of the four outputs. Front panel banana jack test points for 12VDC, 24VDC, and logic ground shall also be provided. The power supply shall provide 5A of power and be able to cover the load of four (4) complete detector racks.

9-29.13(4)H Ethernet Switch

Ethernet switch shall be EtherWAN ED3575-622 Hardened Managed Switch with 2 VDSL2 Ethernet Extender ports. 6 10/100TX, + Gigabit SFP Combo + 2 Copper Pair VDSL2 Ports. (Etherwan P/N ED3575-622). A 30 watt, 24VDC output power supply unit shall be provided by the same manufacturer as the switch. A DSL-Octal Cable 2xRJ45, and a minimum 6' Ethernet patch cable shall be provided with each. Two (2) SFP Optics 100Base-FX SM, 1310NM, 15KM, LC fiber optic units shall be provided with each switch.

9-29.13(4)I Uninterruptable Power System (UPS)

The cabinet shall come with a complete uninterruptable power system (UPS), also referred to as a Batter Backup System (BBS). The UPS shall include at a minimum a UPS module with SNMP, ATS assembly, batteries, battery heater mats, battery cables and a battery management system. All other ancillary equipment for a complete functioning UPS system shall be included.

The key UPS system components are identified in the subsection below.

9-29.13(4)I1 UPS Module

The cabinet shall come with (1) FXM 1100W uninterruptible power supply or approved equivalent that supplies clean reliable power control and management. It shall have Automatic Voltage Regulation (AVR), an Ethernet SNMP interface and a control and power connection panel that is rotatable for viewing in any vertical or horizontal orientation. It shall have nominal dimensions of 5.22" x 15.5" x 8.75" and come with mounting brackets. The UPS module shall be an Alpha model 017-201-23 or approved equivalent.

9-29.13(4)I2 UATS/UGTS Assembly

The cabinet shall come with (1) universal automatic transfer switch and universal generator transfer switch connected between the UPS module and the batteries. It shall have surge protection, have dimensions of 3.25" x 15.5" x 6.00" and come with mounting brackets. The ATS module shall be an Alpha model 020-168-25 or approved equivalent.

9-29.13(4)I3 UPS Batteries

The cabinet shall come with (4) high performance Absorbed Glass Mat (AGM) AlphaCell™ batteries with 112Ah runtime. The BBS batteries shall be Alpha model 240XTV or equivalent.

9-29.13(4)I4 UPS Battery Harness

The cabinet shall come with (1) battery cable (10) foot long wired for (4) batteries. The battery harness shall be Alpha model 740-678-27 or equivalent.

9-29.13(4)I5 Battery Management System

The cabinet shall come with AlphaGuard™ battery charge management system Alpha model 012-306-21 or approved equivalent.

9-29.13(4)J Preemption/Priority Equipment

The cabinet shall come with (1) 4-channel rack mounted Opticom™ phase selector. This device shall be capable of receiving encoded signals from Opticom series 700 emitters and detectors. The Opticom™ phase selectors shall be Global Traffic Technologies model 764 or equivalent.

9-29.13(4)K BUS Interface Unit (BIU)

The cabinet shall come with four (4) BIU's. They shall meet all requirements of NEMA TS2-1998 standards. In addition, all BIU's shall provide separate front panel indicator LED's for DC power status and SDLC Port 1 transmit and receive status. Each BIU's shall utilize only 1 rack position.

The (BIU)'s shall be Eberle Design, Inc. model BIU-700H, Econolite model BIU-64, Reno A&E model BIU/2, or Engineer approved equal.

9-29.13(5) Manufacturer Testing and Certification

The complete cabinet assembly with electronics shall undergo complete input/output function testing by the manufacturer before being released to the City of Tacoma.. Testing shall be done via service feed to the 120VAC field terminal. Service power shall be routed through the generator bypass switch, UPS inverter before being connected to the power panel so that all service load circuits are tested.

If the cabinet specified comes with a UPS system (BBS) and batteries; the entire controller cabinet assembly shall undergo a BBS field test procedure where the cabinet is run off battery power for a minimum of one hour.

9-29.16 Vehicular Signal Heads, Displays, and Housing

9-29.16(2)B Signal Housing

The second paragraph is supplemented with the following:

The door shall open a minimum of 160 degrees.

The third paragraph is supplemented with the following:

ADDENDUM 1 – Specification PW21-0719F
Special Provision Section 9-29

The sections shall be held firmly together by corrosion-resistant hardware in such a manner that additional sections may be added easily.

The fourth paragraph is supplemented with the following:

The terminal strip for a standard three-section head shall be a minimum five-position, ten-terminal, barrier-type strip with No. 8 screw-type fasteners. To one side of each terminal shall be attached the white, red, yellow and green signal section leads, leaving the opposite terminal for field wires. Multi-section heads shall be provided with a terminal strip located in the yellow (center) section. Lead shall be No. 18 AWG type with 1/32-inch wall, 105-1/4 centigrade thermoplastic insulation.

9-29.16(3) Polycarbonate Traffic Signal Heads

This section is deleted.

9-29.17 Signal Head Mounting Brackets and Fittings

This section is revised to read:

Vehicle and pedestrian signal heads shall be as detailed in the standard plans.

Span wire vehicle signal hanger hardware shall consist of span wire clamp, balance adjuster, wire entrance fitting and vehicle head locking device.

A. Construction

1. Bronze hangers are required.
2. The minimum size of pins shall be 5/8-inch diameter. Pins shall be stainless steel.
3. The minimum size of the 'J' or 'U' cable clamps is 1/2-inch diameter. Cable clamp bolts shall be stainless steel. Clamping insert shall be used.
4. The cable saddle shall be at least 9 inches long.
5. All cotter pins shall be brass and washers shall be stainless steel.
6. All hardware shall be of stainless steel, bronze or brass materials.
7. Signal stem shall be locked with a square headed set screw 1/4-inch minimum in diameter.
8. Wire entrance shall be a minimum of 1-1/4-inch diameter and shall have a female threaded base for nipple.
9. The balance adjuster shall not be used.
10. All stems shall be secured to signal head with proper lock fitting.

Vehicle signal heads attached to a mast arm shall use a type M mounting bracket as detailed in the standard plans and in accordance with Section 8-20.3(14)B and Section 9-29.17.

9-29.18 Vehicle Detector

This section is supplemented with the following:

Unless otherwise specified in the contract plans, the vehicle detection system provided shall be a Gridsmart detection system with the performance plus module.

9-29.18(3) Gridsmart Detection System

The Gridsmart system provided shall provide all necessary components required in order to fully install, setup, test, operate and maintain a fully functional detection system, including, but not limited to, the following components:

1. Gridsmart Power over Ethernet Bell Camera(s)
2. GS2 Gridsmart Processor with the Performance Plus Module
3. Mounting Hardware
4. Connection Cables.

Unless otherwise identified in the project plans, one Bell Camera is required for each intersection. Additional cameras may be required, and will be identified in the project plans when two or more major arterials intersect, or where sight lines require additional cameras. Changes to the intersection layout, or camera locations may require additional cameras for proper functionality. Field adjustments to the camera location shall not be permitted without approval from the Engineer.

All mounting hardware and cabling shall meet the manufacturer's recommendations, unless otherwise specified herein.

9-29.19 Pedestrian Push Buttons

This section is supplemented with the following:

Pushbutton systems shall be fully compliant with Accessible Pedestrian System requirements as defined by the American with Disabilities Act. Pushbutton systems shall be two wire systems (four wire systems shall not be permitted).

Unless otherwise specified, the pedestrian push button central control unit shall be Polara shelf mount control unit capable of communication through a SDLC cable (Polara Model ICCU-S).

Push buttons stations shall be Polara - iN2 series with the following options:

1. 9x12 Front Plate Adapter
2. 9x12 Faceplate compliant with MUTCD R10-3b
3. No braille on Face Plate
4. Custom Messages
5. Black Button Cover

Extenders may be required for locations where the APS buttons are not within an acceptable reach. Extenders or adapters may be required to accommodate the size of the faceplates for locations where two pushbuttons are mounted to the same pole.

9-29.20 Pedestrian Signals

This section is supplemented with the following:

1
2 All pedestrian signals housings shall be die-cast aluminum.

3
4 *The Vacant Section 9-29.22 is replaced with the following:*

5 **9-29.22 Preemption Hardware**

6
7 Preemption Hardware shall be Opticom TM Model 721 unless otherwise specified.

8
9 **9-29.24 Service Cabinets**

10 *This section is supplemented with the following:*

11
12 Service cabinets shall be pole mounted, exterior NEMA 3R Rated with a bolt on HUB
13 for top entry. Cabinet shall be a maximum 10 inches wide, 14 inches high, and 5
14 inches deep.

15
16 Load Center shall have between 100 and 150 Amps, with capacity for 6 spaces and
17 12 circuits, or 8 spaces and 16 circuits as required by Code.

18
19 Service panels shall be Square D – QO Series

20
21
22 **9-29.24(2) Electrical Circuit Breakers and Contactors**

23 *The first paragraph is supplemented with the following:*

24
25 Mercury relays shall not be accepted. Contactors shall be one of the following
26 brands:

- 27 1. Square D
28 2. Siemens
29 3. Eaton/Cutler Hammer
30 4. Engineer Approved Equal

31
32 *The second paragraph is deleted.*

33
34 *The third sentence of the third paragraph is deleted.*

35
36 *The third paragraph is supplemented with the following:*

37
38 All service panel breakers shall be one of the following brands/series

- 39 1. Square D – QO Series
40 2. Siemens – Type BL
41 3. Eaton/Cutler Hammer – Quick Lag Type BA
42 4. Engineer approved Equal

43
44 All surface mount breakers shall be one of the following Brands/Series:

- 45 1. Square D (Type QOU)
46 2. Siemens
47 3. Eaton/Cutler Hammer
48 4. General Electric
49 5. Engineer approved Equal

9-29.25 Amplifier, Transformer, and Terminal Cabinets

This section is supplemented with the following:

Terminal compartments may be incorporated into the signal standard as an alternative to providing a separate terminal cabinet attached to the pole. Terminal compartment should offer similar physical and electrical capacity as specified. Contractor shall provide submittals in accordance with the contract documents and obtain approval from the engineer for the alternate design prior to proceeding. Signal standards and terminal compartments shall meet all other structural, mechanical, electrical, and finish requirements as specified, and be suitable for the intended purpose.

END OF SECTION

CITY OF TACOMA
8332

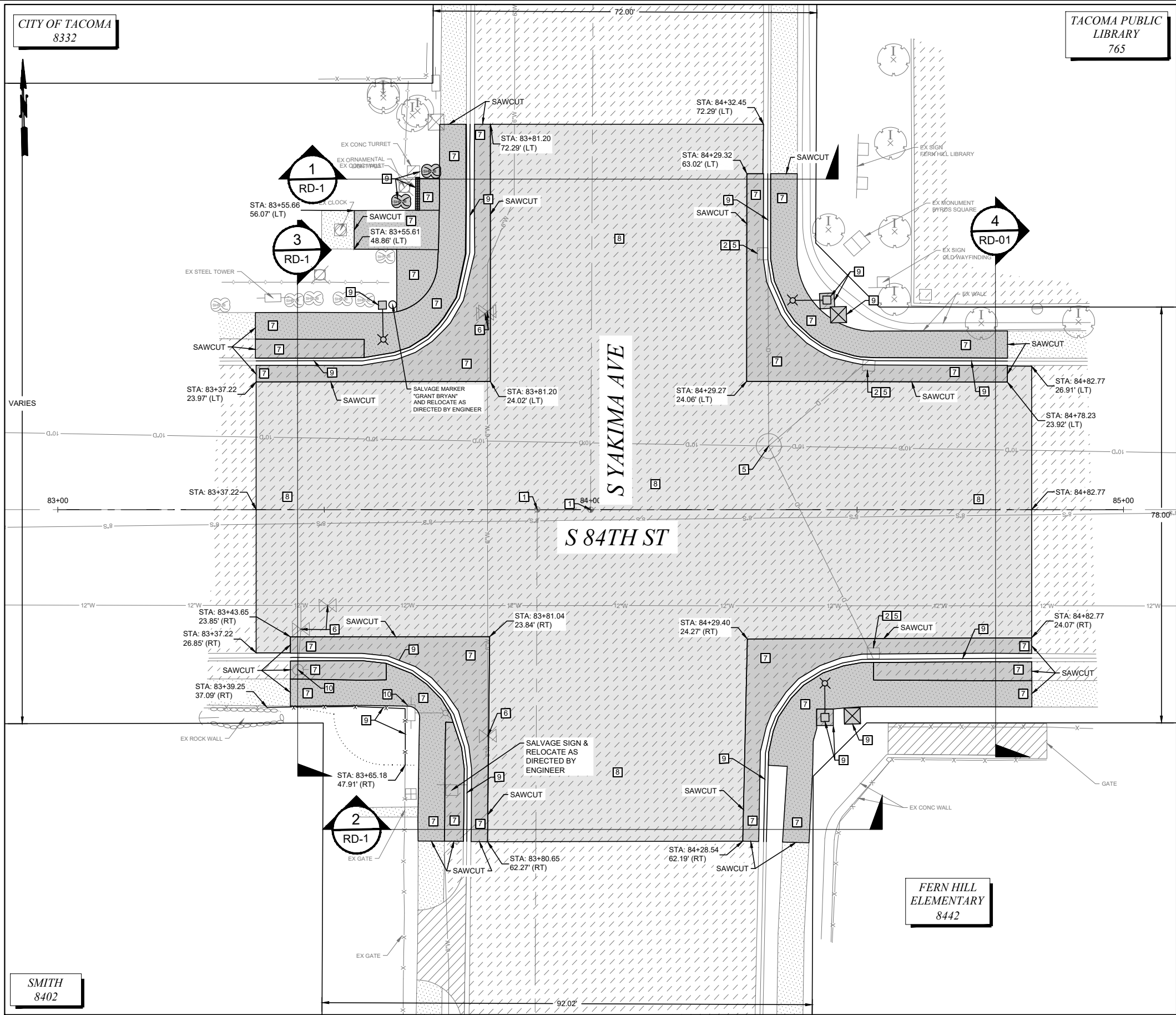
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DEMOLITION NOTES

- 1 REMOVE EXISTING SURVEY MONUMENT IN ACCORDANCE WITH WAC 332-120, SUBMIT DEPARTMENT OF NATURAL RESOURCES APPLICATION FOR PERMIT TO REMOVE OR DESTROY A SURVEY MONUMENT. REMOVE EXISTING MONUMENT COMPLETELY TO INSURE SUITABLE INSTALLATION OF NEW POURED MONUMENT
- 2 PROVIDE INLET PROTECTION TO EXISTING CATCH BASIN PER SPECIFICATION 8-01 UNTIL REMOVAL OR END OF CONSTRUCTION ACTIVITIES
- 3 TO BE ADJUSTED BY OTHERS
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- 5 ADJUST TO GRADE PER SPECIFICATION 7-05
- 6 ADJUST EXISTING VALVE PER CITY OF TACOMA STANDARD SU-37
- 7 REMOVE PAVEMENT PER SPECIFICATION 2-14
- 8 1" MAX DEPTH PAVEMENT GRIND, TRANSITION TO 0" GRIND AT CROWN OR CENTER OF EX PAVEMENT. SEE ALSO ROAD SECTIONS ON SHEET RD-1
- 9 TO BE REMOVED
- 10 PRESERVE AND PROTECT EXISTING UTILITIES

GENERAL NOTE

FOR REMOVAL, RELOCATION, AND NEW CONSTRUCTION OF SIGNAL POLES, STRAIN POLES, UTILITY POLES, LIGHTS, AND ANY ELECTRICAL RELATED ITEMS; THE SIGNAL PLANS, SHALL GOVERN



HORIZ. DATUM: N.A.D. 83/91
VERT. DATUM: N.G.V.D. 29
BENCH MARK: EAST SBM
INTERSECTION OF S. 84TH ST.
AND YAKIMA AVE. S.
ELEVATION = 365.72'

CITY OF
TACOMA

20 0 20 40 60
SCALE IN FEET

CALL BEFORE YOU DIG
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ONLY PER BEST AVAILABLE INFO, AND MAY BE INCOMPLETE.
CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING,
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ADDENDUM 1

NO REVISION

11/22/21 RDV

FINAL
CONSTRUCTION
CHECKED

BY

DATE

FIELD BOOKS

DATE

DESIGNED

DRAWN

DRAWING NAME

NOV 2021

RDR

COB

HSIPYak-DEMO

SCALE

1" = 10'

PROJECT NAME

HSIPYak-DEMO



11/22/2021

DocuSigned by:

Chris Larson

CITY OF TACOMA
DEPARTMENT OF PUBLIC WORKS

DEMOLITION PLANS
SOUTH YAKIMA SIGNAL AND SAFETY IMPROVEMENTS
S YAKIMA ST @ S 84TH ST

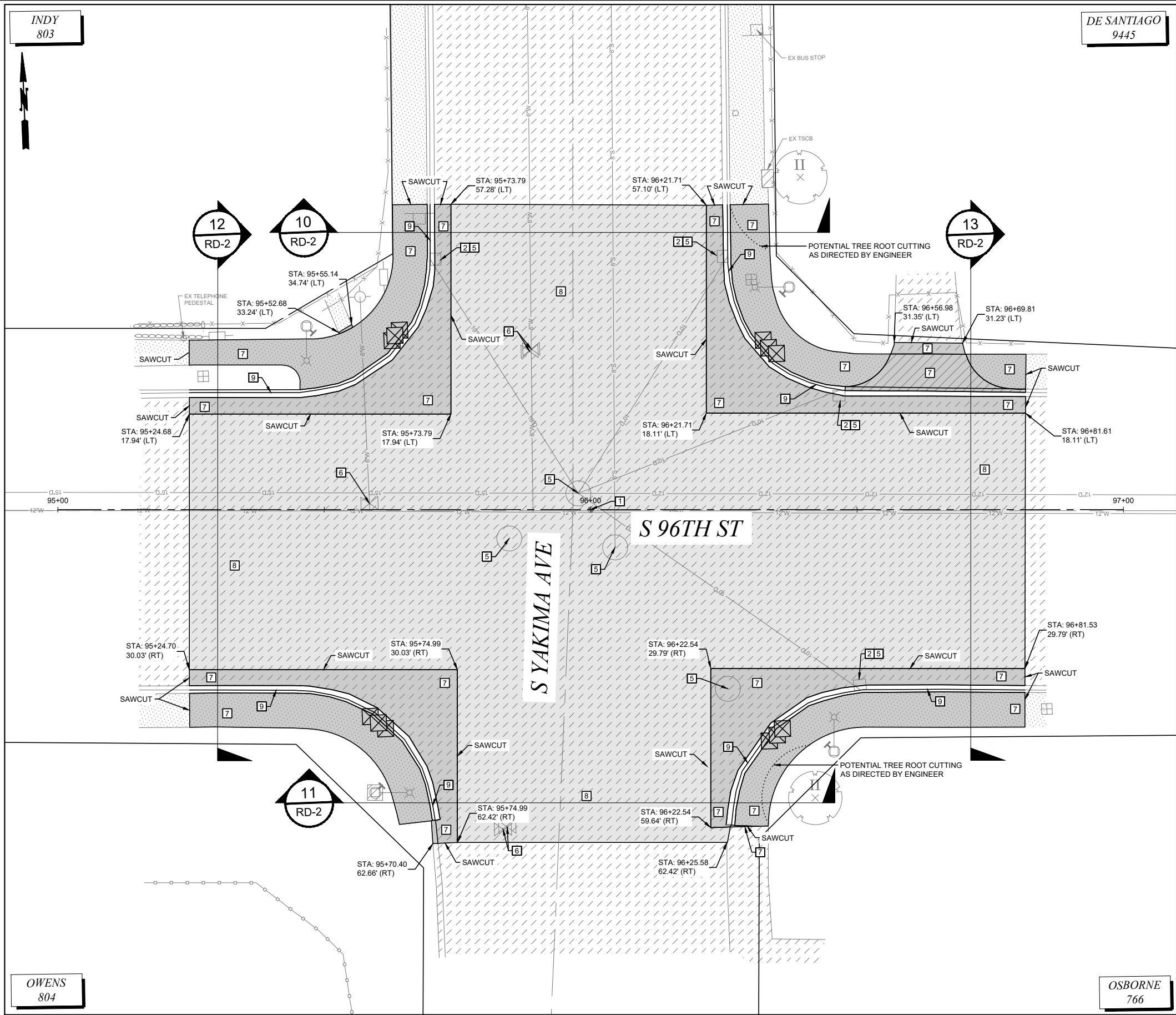
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SHEET NO. 7

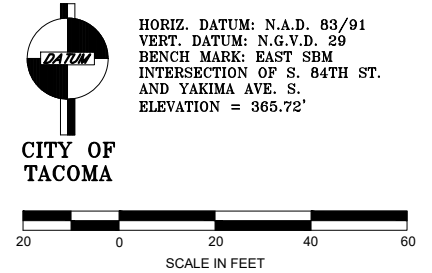
SHEET D-1 OF D-2




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- DEMOLITION NOTES**
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 - 9 TO BE REMOVED
 - 10 PRESERVE AND PROTECT EXISTING UTILITIES
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CALL BEFORE YOU DIG EXISTING UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS ONLY PER BEST AVAILABLE INFO, AND MAY BE INCOMPLETE. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING, POTHOLING AND AVOIDING ALL EXISTING UTILITIES. CALL TWO BUSINESS DAYS BEFORE YOU DIG (1-800-424-5555) OR VISIT ONLINE: www.callbeforeyoudig.org				ADDENDUM 1		11/22/21 RDV		FINAL CONSTRUCTION CHECKED		DATE NOV 2021		SCALE 1" = 10'				CITY OF TACOMA DEPARTMENT OF PUBLIC WORKS		PWK-G0037			
								BY		DESIGNED RDR		CHECKED DCS		PROJECT NAME HSIP-SYAK72-36		DocuSigned by: 		SOUTH YAKIMA SIGNAL AND SAFETY IMPROVEMENTS		SHEET NO. 8	
								DATE		DRAWN COB		PROJECT NAME HSIP-SYAK72-36		DRAWING NAME HSIPYak-DEMO		11/22/2021		SHEET D-2 OF D-2		P:\Design\Projects\Civil\3D\HSIP-SYAK72-36\Production Drawings\HSIPYak-DEMO.dwg, 11/22/2021 3:58:17 PM, resparza	
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CITY OF TACOMA
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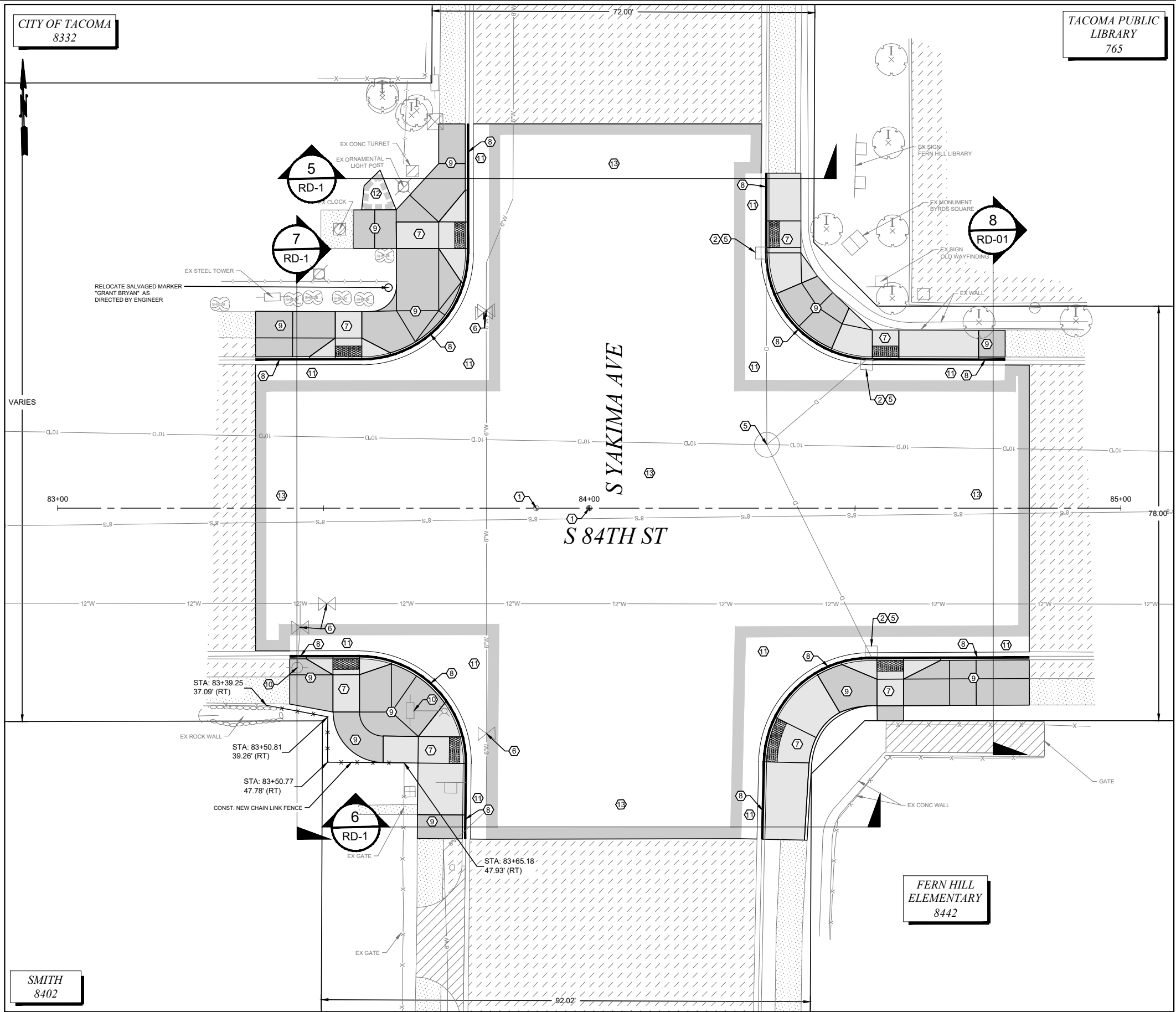
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CONSTRUCTION NOTES

- 1 CONSTRUCT BRASS POURED MONUMENT PER CITY OF TACOMA STANDARD PLAN SU-01
- 2 PROVIDE INLET PROTECTION TO PROPOSED CATCH BASIN PER SPECIFICATION 8-01 UNTIL END OF CONSTRUCTION ACTIVITIES
- 3 TO BE ADJUSTED BY OTHERS
- 4 TO BE RELOCATED BY OTHERS
- 5 ADJUST TO GRADE PER SPECIFICATION 7-05
- 6 ADJUST EXISTING VALVE PER CITY OF TACOMA STANDARD SU-37
- 7 CONSTRUCT CEMENT CONCRETE CURB RAMP PER CITY OF TACOMA STANDARD PLAN SU-05 SERIES
- 8 CONSTRUCT CEMENT CONCRETE TRAFFIC CURB AND GUTTER PER CITY OF TACOMA STANDARD PLAN SU-03
- 9 CONSTRUCT CEMENT CONCRETE SIDEWALK PER CITY OF TACOMA STANDARD PLAN SU-04
- 10 PRESERVE AND PROTECT EXISTING UTILITIES
- 11 CONSTRUCT HMA PAVEMENT AND BASE. REFER TO CROSS SECTION FOR MATERIAL AND DEPTHS.
- 12 GRADE FOR POSITIVE DRAINAGE AND PLACE 2 INCH CRUSHED SURFACING TOP COURSE
- 13 CONSTRUCT 2 INCH HMA OVERLAY

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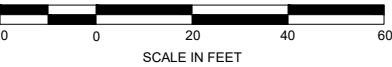


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CITY OF
TACOMA

HORIZ. DATUM: N.A.D. 83/91
VERT. DATUM: N.G.V.D. 29
BENCH MARK: EAST SBM
INTERSECTION OF S. 84TH ST.
AND YAKIMA AVE. S.
ELEVATION = 365.72'



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ADDENDUM 1

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11/22/21 RDV

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CONSTRUCTION
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BY

DATE

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DATE

DESIGNED

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PROJECT NAME

SCALE

1" = 10'



DocuSigned by:

Chris Larson

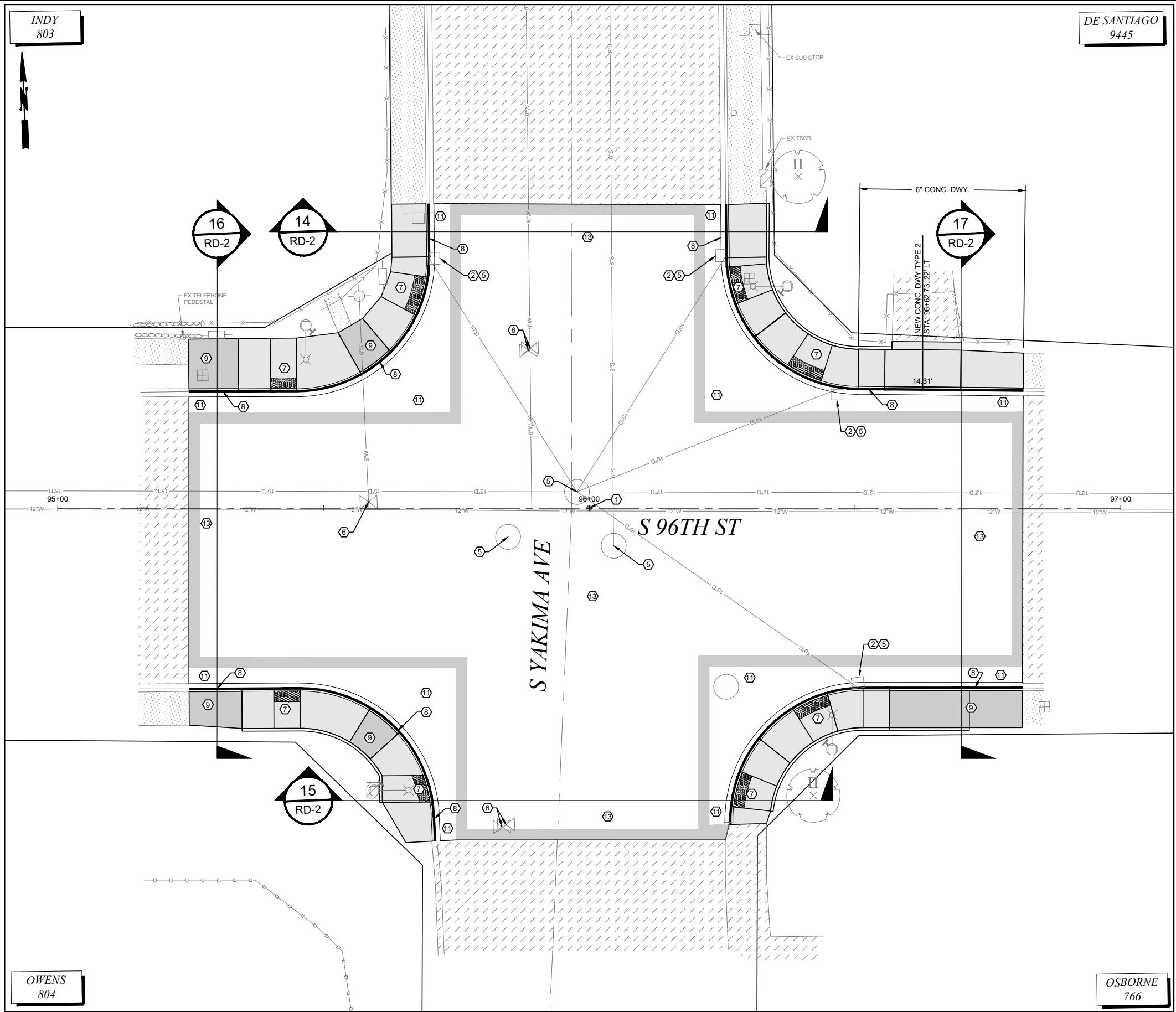
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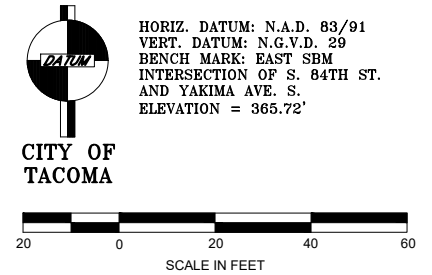
CONSTRUCTION PLANS
SOUTH YAKIMA SIGNAL AND SAFETY IMPROVEMENTS
S YAKIMA ST @ S 84TH ST

PWK-G0037

SHEET NO. 9
SHEET C-1 OF C-2



- CONSTRUCTION NOTES**
- 1 CONSTRUCT BRASS POURED MONUMENT PER CITY OF TACOMA STANDARD PLAN SU-01
 - 2 PROVIDE INLET PROTECTION TO PROPOSED CATCH BASIN PER SPECIFICATION 8-01 UNTIL END OF CONSTRUCTION ACTIVITIES
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BY DATE

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FINAL CONSTRUCTION CHECKED

DATE NOV 2021

DESIGNED RDR

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DATE 11/22/2021

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Chris Larson

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CITY OF TACOMA

DEPARTMENT OF PUBLIC WORKS

CONSTRUCTION PLANS

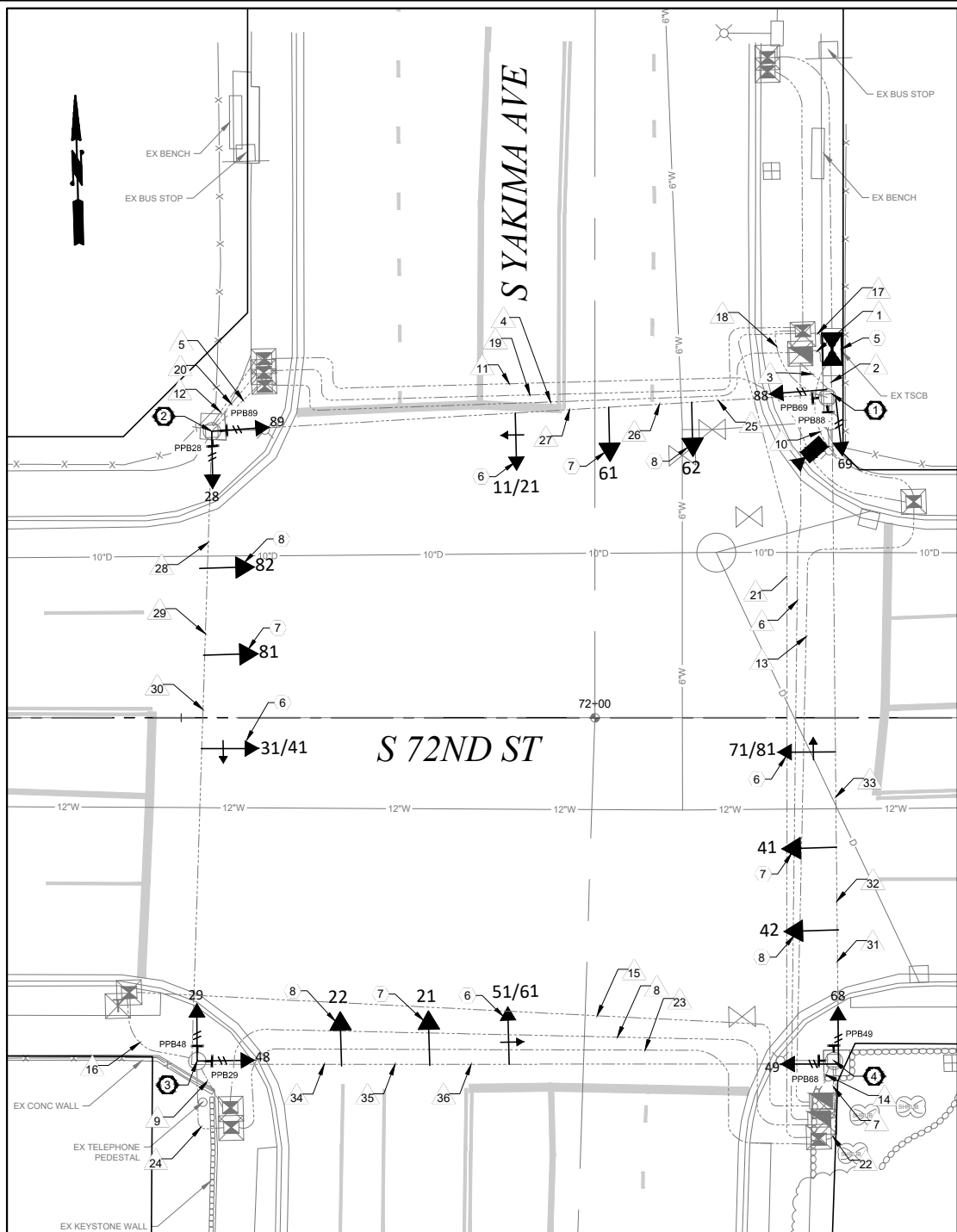
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SHEET NO. 10

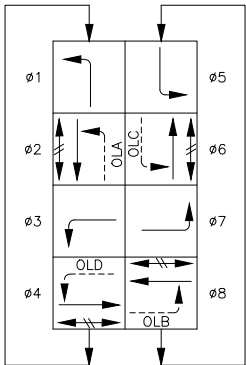
SHEET C-2 OF C-2



WIRING SCHEDULE											
RUN NO Δ	CONDUIT (INCHES)	SERVICE 2-#6	SL #8 ³	GND ⁴ #10G	LOOP CABLE #18 ¹	PPB 2C	PED HEAD 5C	VEH HEAD 5C	CAT5e	IC ² 6 PR CC	NOTE
		QTY	QTY	QTY	QTY	QTY	QTY	QTY		QTY	
1	2"			1		6	3	6			
	2"			1							
	2"			1							
2	1-1/4"			1		2			1		
	1-1/4"			1			1				
	1-1/4"			1				2			
3	1-1/4"			1							SPARE
4	2"			1		2					
5	2"			1			1	2			
	1-1/4"			1		2					
6	1-1/4"			1			1	2			
	2"			1		4					
7	2"			1			2	4			
	1-1/4"			1		2					
8	1-1/4"			1			1	2			
	2"			1		2					
9	2"			1			1	2			
	2"			1		2					
10	2"			1						2	EXISTING COM. PROTECT
	2"			1	10						
	2"			1	10						
11	2"			1	5						
	2"			1							
12	1-1/4"			1							
13	2"			1	10					1	
	2"			1							
14	1-1/4"			1							
15	2"			1	5						
	2"			1							
16	2"			1							
17	1-1/4"	1		1							EXISTING SERVICE POWER
18	1-1/4"		2	1							EXISTING STREET LIGHTS
19	1-1/4"		2	1							EXISTING STREET LIGHTS
20	1-1/4"		2	1							EXISTING STREET LIGHTS
21	1-1/4"		2	1							EXISTING STREET LIGHTS
22	1-1/4"		2	1							EXISTING STREET LIGHTS
23	1-1/4"										EXISTING STREET LIGHT CONDUIT
24	1-1/4"										EXISTING STREET LIGHT CONDUIT
25	SPAN WIRE							2			SPAN WIRE
26	SPAN WIRE							2			SPAN WIRE
27	SPAN WIRE							1			SPAN WIRE
28	SPAN WIRE							2			SPAN WIRE
29	SPAN WIRE							2			SPAN WIRE
30	SPAN WIRE							1			SPAN WIRE
31	SPAN WIRE							2			SPAN WIRE
32	SPAN WIRE							2			SPAN WIRE
33	SPAN WIRE							1			SPAN WIRE
34	SPAN WIRE							2			SPAN WIRE
35	SPAN WIRE							2			SPAN WIRE
36	SPAN WIRE							1			SPAN WIRE

- NOTES
- 1 PROTECT EXISTING LOOP CABLES.
 - 2 PROTECT EXISTING INTERCONNECT
 - 3 PROTECT EXISTING STREET LIGHT POWER
 - 4 ALL CONDUITS TO BE GROUNDED. INSTALL NEW GROUND WIRE IF MISSING OR DAMAGED
 - 5 COMPOSITE FIBER CABLE PER SPECIFICATION 9-29.18(3) GRIDSMA RT DETECTION SYSTEM

SIGNAL PHASING



- PERMISSIVE MOVEMENT
PROTECTED MOVEMENT
PEDESTRIAN MOVEMENT
- OLA = Ø1 + Ø2
OLB = Ø3 + Ø4
OLC = Ø5 + Ø6
OLD = Ø7 + Ø8

SIGNAL LEGEND			
DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL
CONSTRUCTION NOTE	#	PEDESTRIAN PUSHBUTTON	-
SIGNAL POLE CONSTRUCTION NOTE	#	VIDEO DETECTION CAMERA	
WIRE NOTE	#	TYPE 1 JUNCTION BOX	
TYPE PPB POST W/PUSHBUTTON(S)	#	TYPE 2 JUNCTION BOX	
SIGNAL POLE WITH MAST ARM		TYPE 8 JUNCTION BOX	
TYPE 1 SIGNAL POLE	⊗	PULL BOX	
VEHICLE SIGNAL HEAD	→	EXISTING JUNCTION BOX	
PEDESTRIAN SIGNAL HEAD	→	CONTROLLER CABINET	
EMERGENCY PREEMPTION DETECTOR	→	SERVICE PEDESTAL	
EXISTING STRAIN POLE (WITH LUMINAIRE)	⊗	CONDUIT	
MAST ARM MOUNTED SIGN	TT		

GENERAL NOTES

- 1 ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH CITY OF TACOMA STANDARDS, WSDOT/APWA STANDARD PLANS, STANDARD SPECIFICATIONS, LATEST AMENDMENTS TO THE STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND THESE PLANS.
- 2 THE CONTRACTOR SHALL PROVIDE ALL MATERIALS SUBMITTALS TO THE CITY ENGINEER FOR CITY APPROVAL PRIOR TO START OF CONSTRUCTION.
- 3 EXISTING SIGNAL EQUIPMENT NOT NOTED TO BE REMOVED SHALL REMAIN IN PLACE AND PROTECTED FROM DAMAGE.
- 4 CONTRACTOR SHALL COORDINATE ALL TRAFFIC SIGNAL RELATED WORK WITH CITY OF TACOMA TRAFFIC MAINTENANCE SHOP (253) 591-5287.
- 5 ALL CONDUCTORS FOR APS PUSH BUTTONS TO BE NEW AND RUN BACK TO TRAFFIC SIGNAL CABINET.
- 6 CONDUITS SHOWN ARE EXISTING UNLESS OTHERWISE NOTED.
- 7 ALL WORK SHALL BE CONSISTENT WITH UTILITY AGENCY REQUIREMENTS. THE CONTRACTOR SHALL CONTACT ALL PERTINENT UTILITY AGENCIES 48 HOURS BEFORE COMMENCING WORK AND SHALL COORDINATE WITH AFFECTED UTILITY AGENCIES THROUGHOUT THE PROJECT.
- 8 THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES. THE CONTRACTOR SHALL NOTIFY THE AFFECTED UTILITY COMPANY AND THE CITY IMMEDIATELY UPON DAMAGE.
- 9 CONTRACTOR SHALL CONFIRM THAT THERE IS A MINIMUM 10-FT CLEARANCE PROVIDED BETWEEN OVERHEAD POWER LINES AND PROPOSED LUMINAIRE POLES PRIOR TO FOUNDATION INSTALLATION.
- 10 A TRAFFIC SIGNAL SHOP REPRESENTATIVE SHALL BE PRESENT FOR ALL WORK OCCURRING WITHIN THE TRAFFIC SIGNAL CABINET. ONLY JOURNEY LEVEL WORK SHALL TAKE PLACE WITHIN THE TRAFFIC SIGNAL CABINET.

CONSTRUCTION NOTES

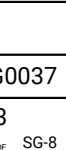
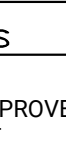
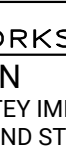
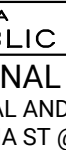
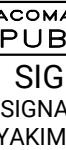
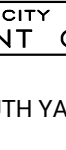
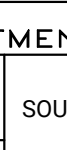
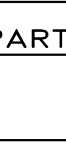
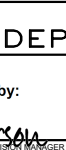
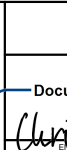
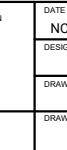
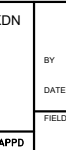
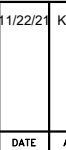
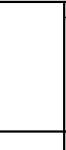
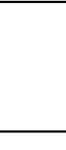
- 1 A. REMOVE TWO EXISTING PEDESTRIAN PUSHBUTTONS. FURNISH AND INSTALL TWO APS PUSH BUTTONS ON EXISTING STRAIN POLE.
B. REMOVE TWO EXISTING PEDESTRIAN HEADS. FURNISH AND INSTALL TO COUNTDOWN PEDESTRIAN HEAD WITH NEW CLAMSHELL (TYPE E) MOUNT ON EXISTING STRAIN POLE.
C. FURNISH AND INSTALL NEW TERMINAL CABINET ON EXISTING STRAIN POLE.
D. FURNISH AND INSTALL NEW GRIDSMA RT VIDEO DETECTION SYSTEM PER MANUFACTURERS RECOMMENDATION ON LUMINAIRE ARM.
E. PLUG UNUSED HOLES IN POLE.
F. INSTALL NEW SPAN WIRE FOR NEW SIGNAL HEADS PER COT STANDARD PLAN TS-02 AND SPAN WIRE INSTALLATION DETAIL THIS SHEET.
- 2 A. REMOVE TWO EXISTING PEDESTRIAN PUSHBUTTONS. FURNISH AND INSTALL TWO APS PUSH BUTTONS ON EXISTING STRAIN POLE.
B. REMOVE TWO EXISTING PEDESTRIAN HEADS. FURNISH AND INSTALL TO COUNTDOWN PEDESTRIAN HEAD WITH NEW CLAMSHELL (TYPE E) MOUNT ON EXISTING STRAIN POLE.
C. INSTALL NEW TERMINAL CABINET ON EXISTING STRAIN POLE.
D. PLUG UNUSED HOLES IN POLE
E. INSTALL NEW SPAN WIRE FOR NEW SIGNAL HEADS PER COT STANDARD PLAN TS-02 AND SPAN WIRE INSTALLATION DETAIL THIS SHEET.
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C. INSTALL NEW TERMINAL CABINET ON EXISTING STRAIN POLE.
D. PLUG UNUSED HOLES IN POLE
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- 4 A. REMOVE TWO EXISTING PEDESTRIAN PUSHBUTTONS. FURNISH AND INSTALL TWO APS PUSH BUTTONS ON EXISTING STRAIN POLE.
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C. INSTALL NEW TERMINAL CABINET ON EXISTING STRAIN POLE.
D. PLUG UNUSED HOLES IN POLE
E. INSTALL NEW SPAN WIRE FOR NEW SIGNAL HEADS PER COT STANDARD PLAN TS-02 AND SPAN WIRE INSTALLATION DETAIL THIS SHEET.
- 5 A. REPLACE EXISTING TRAFFIC SIGNAL CABINET WITH NEW P-44 TS-2 TRAFFIC SIGNAL CABINET WITH NEW SIEMENS M-62 TRAFFIC SIGNAL CONTROLLER AND ALL CABINET APPURTENANCES. FURNISH AND INSTALL GRIDSMA RT PROCESSOR IN NEW CABINET.
B. THE FOLLOWING EQUIPMENT SHALL BE TRANSFERRED TO THE NEW CABINET
• ACTELIS NETWORK SWITCH
- 6 A. INSTALL NEW TRAFFIC SIGNAL HEAD WITH 12 INCH INDICATIONS, BACK PLATE, AND 1 INCH REFLECTIVE BOARDER PER SIGNAL DISPLAY AND PHASING DIAGRAM THIS SHEET. INSTALL NEW 5C CABLE TO NEW TERMINAL CABINET ON STRAIN POLE. INSTALL SIGNAL HEAD ON NEW SPAN WIRE PER CITY OF TACOMA STANDARD PLANS TS-01, TS-02, AND DETAIL THIS SHEET.
- 7 A. REMOVE EXISTING TRAFFIC SIGNAL HEAD INSTALL NEW TRAFFIC SIGNAL HEAD WITH 12 INCH INDICATIONS, BACK PLATE, AND 1 INCH REFLECTIVE BOARDER PER SIGNAL DISPLAY AND PHASING DIAGRAM THIS SHEET. INSTALL NEW 5C CABLE JUMPER TO MATCHING SIGNAL HEAD ON SPAN. INSTALL SIGNAL HEAD ON NEW SPAN WIRE PER CITY OF TACOMA STANDARD PLANS TS-01, TS-02, AND DETAIL THIS SHEET.
- 8 A. NEW TRAFFIC SIGNAL HEAD WITH 12 INCH INDICATIONS, BACK PLATE, AND 1 INCH REFLECTIVE BOARDER PER SIGNAL DISPLAY AND PHASING DIAGRAM THIS SHEET. INSTALL NEW 5C CABLE TO NEW TERMINAL CABINET ON POLE. INSTALL SIGNAL HEAD ON NEW SPAN WIRE PER CITY OF TACOMA STANDARD PLANS TS-01, TS-02, AND DETAIL THIS SHEET.

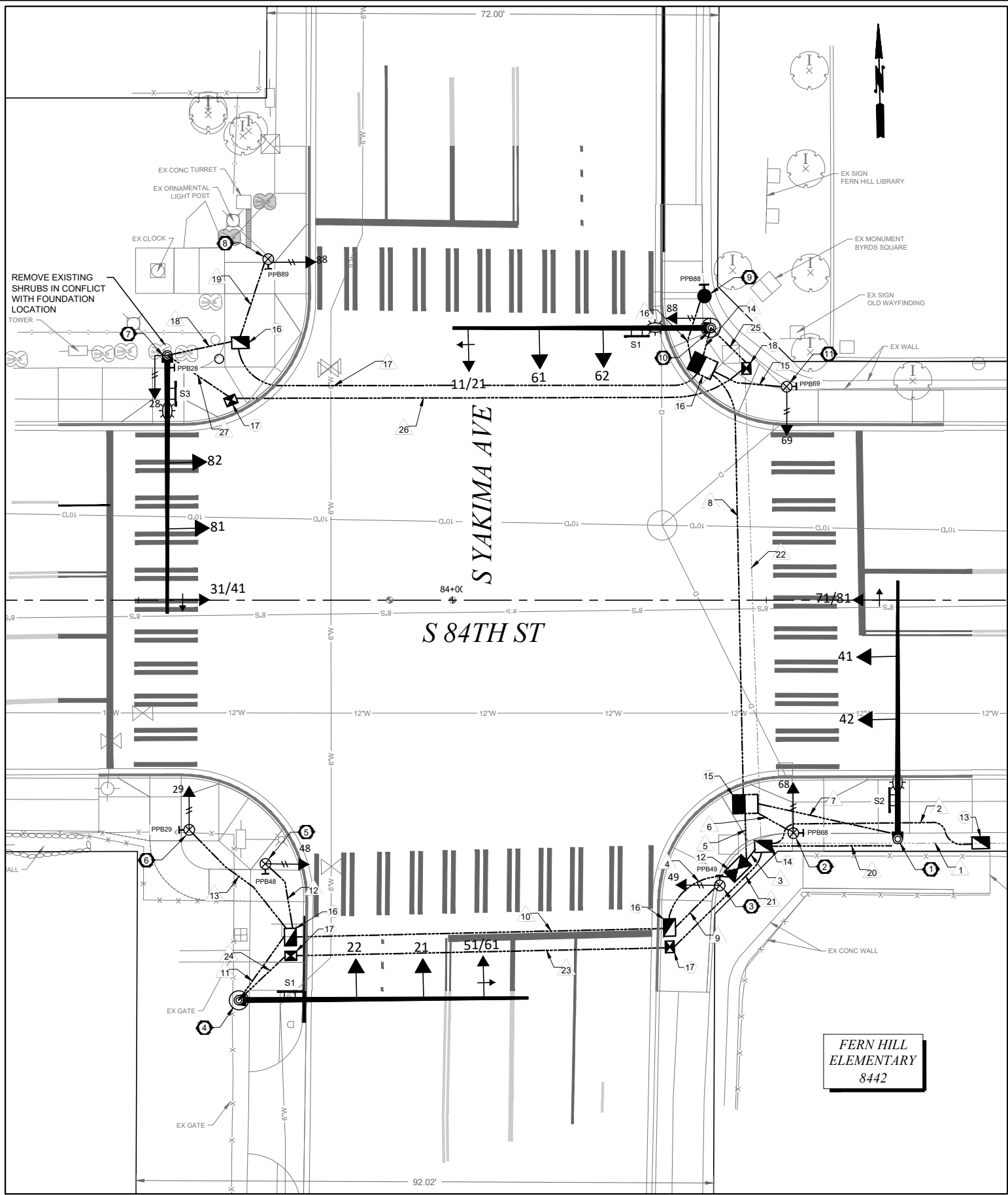


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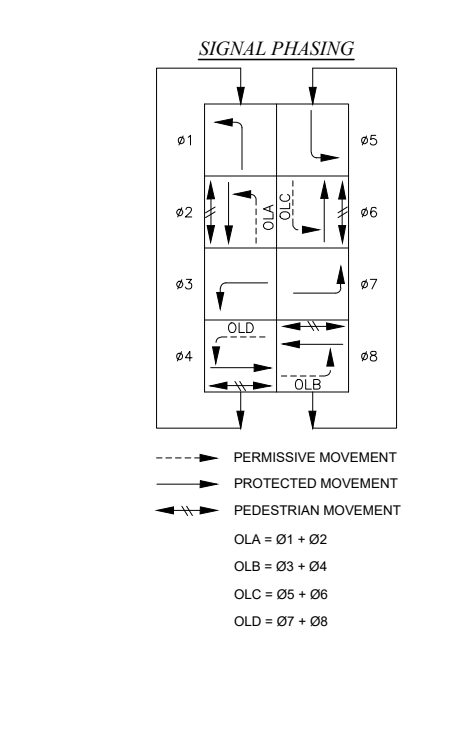
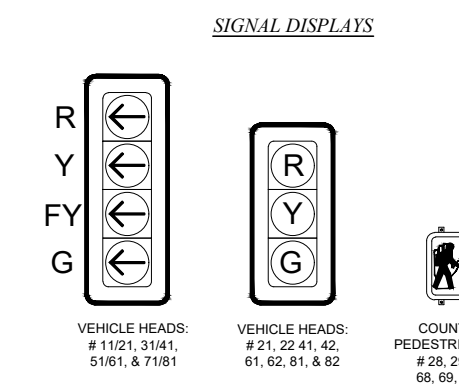
EXISTING UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS ONLY PER BEST AVAILABLE INFO, AND MAY BE INCOMPLETE. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING, POTHOLES AND AVOIDING ALL EXISTING UTILITIES.

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SIGNAL LEGEND	
DESCRIPTION	SYMBOL
CONSTRUCTION NOTE	#
SIGNAL POLE CONSTRUCTION NOTE	#
WIRE NOTE	#
TYPE PPB POST W/PUSHBUTTON(S)	PPB
SIGNAL POLE WITH MAST ARM	MAST ARM
TYPE 1 SIGNAL POLE	TYPE 1
VEHICLE SIGNAL HEAD	VEHICLE
PEDESTRIAN SIGNAL HEAD	PEDESTRIAN
EMERGENCY PREEMPTION DETECTOR	EMERGENCY
EXISTING STRAIN POLE (WITH LUMINAIRE)	EXISTING
MAST ARM MOUNTED SIGN	MAST ARM
PEDESTRIAN PUSHBUTTON	PPB
VIDEO DETECTION CAMERA	CAMERA
TYPE 1 JUNCTION BOX	J-21.15
TYPE 2 JUNCTION BOX	J-21.16
TYPE 8 JUNCTION BOX	J-21.17
PULL BOX	PULL BOX
EXISTING JUNCTION BOX	EXISTING
CONTROLLER CABINET	CABINET
SERVICE PEDESTAL	PEDESTAL
CONDUIT	CONDUIT



- ### CONSTRUCTION NOTES
- A. FURNISH AND INSTALL NEW TYPE III SIGNAL POLE WITH 40 FEET LONG MAST ARM.
B. INSTALL THREE SIGNAL HEADS WITH 12 INCH INDICATIONS, BACK PLATE, AND 1 INCH REFLECTIVE BOARDER PER SIGNAL DISPLAY AND PHASING DIAGRAM THIS SHEET. USE TYPE M MOUNTS WITH TENONS.
C. INSTALL 8 FEET LONG BRACKET STYLE LUMINAIRE ARM PER CITY OF TACOMA STD PLAN TS-07. INSTALL 450WEQ LUMINAIRE ON ARM.
D. INSTALL TERMINAL CABINET ON TRAFFIC SIGNAL POLE. WIRE EACH SIGNAL HEAD INDEPENDENTLY TO TERMINAL CABINET.
 - A. FURNISH AND INSTALL TYPE I SIGNAL POLE WITH BREAKAWAY STYLE FOUNDATION PER WSDOT STD. PLAN J-21.15.
B. FURNISH AND INSTALL ONE COUNTDOWN PEDESTRIAN HEAD WITH CLAMSHELL (TYPE E) MOUNT.
C. FURNISH AND INSTALL APS PUSH BUTTON WITH EXTENSION PER WSDOT PLAN SHEET IS-2. PUSH BUTTON TO BE INSTALLED WITHIN A 10 INCH REACH OF LANDING FOR RAMP.
 - A. FURNISH AND INSTALL TYPE I SIGNAL POLE WITH BREAKAWAY TYLE FOUNDATION PER WSDOT STD. PLAN J-21.15.
B. FURNISH AND INSTALL ONE COUNTDOWN PEDESTRIAN HEAD WITH CLAMSHELL (TYPE E) MOUNT.
C. FURNISH AND INSTALL APS PUSH BUTTON WITH EXTENSION PER WSDOT PLAN SHEET IS-2. PUSH BUTTON TO BE INSTALLED WITHIN A 10 INCH REACH OF LANDING FOR RAMP.
 - A. FURNISH AND INSTALL NEW TYPE II SIGNAL POLE WITH 45 FEET LONG MAST ARM.
B. INSTALL THREE SIGNAL HEADS WITH 12 INCH INDICATIONS, BACK PLATE, AND 1 INCH REFLECTIVE BOARDER PER SIGNAL DISPLAY AND PHASING DIAGRAM THIS SHEET.
C. INSTALL TERMINAL CABINET ON TRAFFIC SIGNAL POLE. WIRE EACH SIGNAL HEAD INDEPENDENTLY TO TERMINAL CABINET.
 - A. FURNISH AND INSTALL TYPE I SIGNAL POLE PER WSDOT STD. PLAN J-21.15.
B. FURNISH AND INSTALL ONE COUNTDOWN PEDESTRIAN HEAD WITH CLAMSHELL (TYPE E) MOUNT.
C. FURNISH AND INSTALL APS PUSH BUTTON. PUSH BUTTON TO BE INSTALLED WITHIN A 10 INCH REACH OF LANDING FOR RAMP.
 - A. FURNISH AND INSTALL TYPE I SIGNAL POLE WITH BREAKAWAY STYLE FOUNDATION PER WSDOT STD. PLAN J-21.15.
B. FURNISH AND INSTALL ONE COUNTDOWN PEDESTRIAN HEAD WITH CLAMSHELL (TYPE E) MOUNT.
C. FURNISH AND INSTALL APS PUSH BUTTON. PUSH BUTTON TO BE INSTALLED WITHIN A 10 INCH REACH OF LANDING FOR RAMP.
 - A. FURNISH AND INSTALL NEW TYPE III SIGNAL POLE WITH 40 FEET LONG MAST ARM.
B. INSTALL THREE SIGNAL HEADS WITH 12 INCH INDICATIONS, BACK PLATE, AND 1 INCH REFLECTIVE BOARDER PER SIGNAL DISPLAY AND PHASING DIAGRAM THIS SHEET. USE TYPE M MOUNTS WITH TENONS.
C. FURNISH AND INSTALL ONE COUNTDOWN PEDESTRIAN SIGNAL HEAD WITH CLAMSHELL (TYPE E) MOUNT.
D. INSTALL 8 FEET LONG BRACKET STYLE LUMINAIRE ARM PER CITY OF TACOMA STD PLAN TS-07. INSTALL 450WEQ LUMINAIRE ON ARM.
E. INSTALL TERMINAL CABINET ON TRAFFIC SIGNAL POLE. WIRE EACH SIGNAL HEAD INDEPENDENTLY TO TERMINAL CABINET.
 - A. FURNISH AND INSTALL TYPE I SIGNAL POLE WITH BREAKAWAY STYLE FOUNDATION PER WSDOT STD. PLAN J-21.15.
B. FURNISH AND INSTALL ONE COUNTDOWN PEDESTRIAN HEAD WITH CLAMSHELL (TYPE E) MOUNT.
C. FURNISH AND INSTALL APS PUSH BUTTON. PUSH BUTTON TO BE INSTALLED WITHIN A 10 INCH REACH OF LANDING FOR RAMP.
 - A. FURNISH AND INSTALL BREAKAWAY STYLE PPB POLE PER WSDOT STD. PLAN J-20.15.
B. FURNISH AND INSTALL APS PUSH BUTTON. PUSH BUTTON TO BE INSTALLED WITHIN A 10 INCH REACH OF LANDING FOR RAMP.
 - A. FURNISH AND INSTALL NEW TYPE III SIGNAL POLE WITH 40 FEET LONG MAST ARM.
B. INSTALL THREE SIGNAL HEADS WITH 12 INCH INDICATIONS, BACK PLATE, AND 1 INCH REFLECTIVE BOARDER PER SIGNAL DISPLAY AND PHASING DIAGRAM THIS SHEET. USE TYPE M MOUNTS WITH TENONS.
C. FURNISH AND INSTALL ONE COUNTDOWN PEDESTRIAN HEAD WITH CLAMSHELL (TYPE E) MOUNT.
D. INSTALL 8 FEET LONG BRACKET STYLE LUMINAIRE ARM PER CITY OF TACOMA STD PLAN TS-07. INSTALL 450WEQ LUMINAIRE ON ARM.
E. INSTALL TERMINAL CABINET ON TRAFFIC SIGNAL POLE. WIRE EACH SIGNAL HEAD INDEPENDENTLY TO TERMINAL CABINET.
F. INSTALL GRIDSMART CAMERA ON LUMINAIRE ARM PER MANUFACTURES RECOMMENDATIONS.
 - A. FURNISH AND INSTALL TYPE I SIGNAL POLE WITH BREAKAWAY STYLE FOUNDATION PER WSDOT STD. PLAN J-21.15.
B. FURNISH AND INSTALL ONE COUNTDOWN PEDESTRIAN HEAD WITH CLAMSHELL (TYPE E) MOUNT.
C. FURNISH AND INSTALL APS PUSH BUTTON. PUSH BUTTON TO BE INSTALLED WITHIN A 10 INCH REACH OF LANDING FOR RAMP.
 - A. FURNISH AND INSTALL NEW P-44 TS-2 TRAFFIC SIGNAL CABINET WITH NEW SIEMENS M-62 CONTROLLER AND ALL APPURTENANCES.
B. INSTALL CABINET ON NEW FOUNDATION PER SIGNAL CABINET FOUNDATION DETAIL ON SHEET 16A. FACE CABINET SO THAT DOOR OPEN TOWARDS THE SOUTH EAST AWAY FROM THE ROADWAY.
C. TRANSFER THE FOLLOWING EQUIPMENT FROM THE EXISTING SIGNAL CABINET.
 - ACTELIS NETWORK SWITCH

- A. FURNISH AND INSTALL NEW TYPE 2 JUNCTION BOX WITH LOCKING AND SLIP RESISTANT LID PER WSDOT STD. PLAN J-40.10. INSTALL CONCRETE BORDER PER CITY OF TACOMA STD. PLAN TS-08.
B. INTERCEPT EXISTING CONDUIT WITH COMMUNICATIONS AND SERVICE CONDUCTORS. EXTEND SERVICE CONDUCTORS TO KEEP EXISTING SIGNAL IN OPERATION DURING CONSTRUCTION OF NEW TRAFFIC SIGNAL.
C. REROUTE COMMUNICATIONS WIRES AND SERVICE CONDUCTORS TO NEW CABINET LOCATION ON DAY OF SIGNAL TURN ON.
- A. REPLACE EXISTING TYPE 1 JUNCTION BOX WITH NEW TYPE 2 JUNCTION BOX WITH LOCKING AND SKIP RESISTANT LID PER WSDOT STD. PLAN J-40.10. INSTALL CONCRETE BORDER PER CITY OF TACOMA STANDARD PLAN TS-08.
- A. INSTALL NEW TYPE 8 JUNCTION BOX WITH LOCKING WITH LOCKING AND SLIP RESISTANT LID PER WSDOT STANDARD PLAN J-40.30 AND AND CITY OF TACOMA STANDARD PLAN TS-08.
- A. INSTALL NEW TYPE 2 JUNCTION BOX WITH LOCKING AND SLIP RESISTANT LID PER WSDOT DOT STANDARD PLAN J-40.10 AND CITY OF TACOMA STANDARD PLAN TS-08.
- A. INSTALL NEW TYPE 1 JUNCTION BOX WITH LOCKING WITH LOCKING AND SLIP RESISTANT LID PER WSDOT DOT STANDARD PLAN J-40.10 AND CITY OF TACOMA STANDARD PLAN TS-08.
- A. REPLACE NEW TYPE 1 JUNCTION BOX WITH LOCKING WITH LOCKING AND SLIP RESISTANT LID PER WSDOT DOT STANDARD PLAN J-40.10 AND CITY OF TACOMA STANDARD PLAN TS-08.

- ### GENERAL NOTES
- ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH CITY OF TACOMA STANDARDS, WSDOT/APWA STANDARD PLANS, STANDARD SPECIFICATIONS, LATEST AMENDMENTS TO THE STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND THESE PLANS.
 - THE CONTRACTOR SHALL PROVIDE ALL MATERIALS SUBMITTALS TO THE CITY ENGINEER FOR CITY APPROVAL PRIOR TO START OF CONSTRUCTION.
 - THE LOCATION OF ALL CONDUIT AND JUNCTION BOXES ON THIS PLAN ARE FOR GRAPHICAL PRESENTATION ONLY. FINAL LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER IN THE FIELD.
 - CONTRACTOR SHALL COORDINATE ALL TRAFFIC SIGNAL RELATED WORK WITH CITY OF TACOMA TRAFFIC MAINTENANCE SHOP (253) 591-5287.
 - ALL CONDUITS SHALL BE INSPECT BY THE TRAFFIC SIGNAL INSPECTOR PRIOR TO BACKFILL OF TRENCHES.
 - CONTRACTOR SHALL COORDINATE WITH THE ENGINEER AND CITY OF TACOMA TRAFFIC MAINTENANCE REPRESENTATIVES TO DETERMINE SUITABLE DETECTION ZONES.
 - CONTRACTOR SHALL SALVAGE ALL EXISTING METAL POLES TO THE CITY.
 - EXISTING FEATURES TO REMAIN UNLESS OTHERWISE NOTED.
 - ALL WORK SHALL BE CONSISTENT WITH UTILITY AGENCY REQUIREMENTS. THE CONTRACTOR SHALL CONTACT ALL PERTINENT UTILITY AGENCIES 48 HOURS BEFORE COMMENCING WORK AND SHALL COORDINATE WITH AFFECTED UTILITY AGENCIES THROUGHOUT THE PROJECT.
 - THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES. THE CONTRACTOR SHALL NOTIFY THE AFFECTED UTILITY COMPANY AND THE CITY IMMEDIATELY UPON DAMAGE.
 - CONTRACTOR SHALL CONFIRM THAT THERE IS A MINIMUM 10-FT CLEARANCE PROVIDED BETWEEN OVERHEAD POWER LINES AND PROPOSED LUMINAIRE POLES PRIOR TO FOUNDATION INSTALLATION.
 - A TRAFFIC SIGNAL SHOP REPRESENTATIVE SHALL BE PRESENT FOR ALL WORK OCCURRING WITHIN THE TRAFFIC SIGNAL CABINET. ONLY JOURNEY LEVEL WORK SHALL TAKE PLACE WITHIN THE TRAFFIC SIGNAL CABINET.

S YAKIMA Ave 700

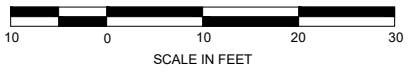
D3-1 MOD
108" x 18"
S2

S YAKIMA Ave 800

D3-1 MOD
108" x 18"
S3

S 84th St

D3-1MOD
72" x 18"
S1



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ADDENDUM 1

NO REVISION

DATE APPD

11/22/21 KDN

FINAL CONSTRUCTION CHECKED

DATE NOV 2021

SCALE 1" = 10'

DESIGNED RDR

CHECKED DCS

DRAWN COB

PROJECT NAME HSIP-SYAK72-36

DRAWING NAME HSIPyak-SIG

DATE 11/22/2021

CITY OF TACOMA
DEPARTMENT OF PUBLIC WORKS

SIGNAL PLAN

SOUTH YAKIMA SIGNAL AND SAFETY IMPROVEMENTS
S YAKIMA ST @ S 84TH ST

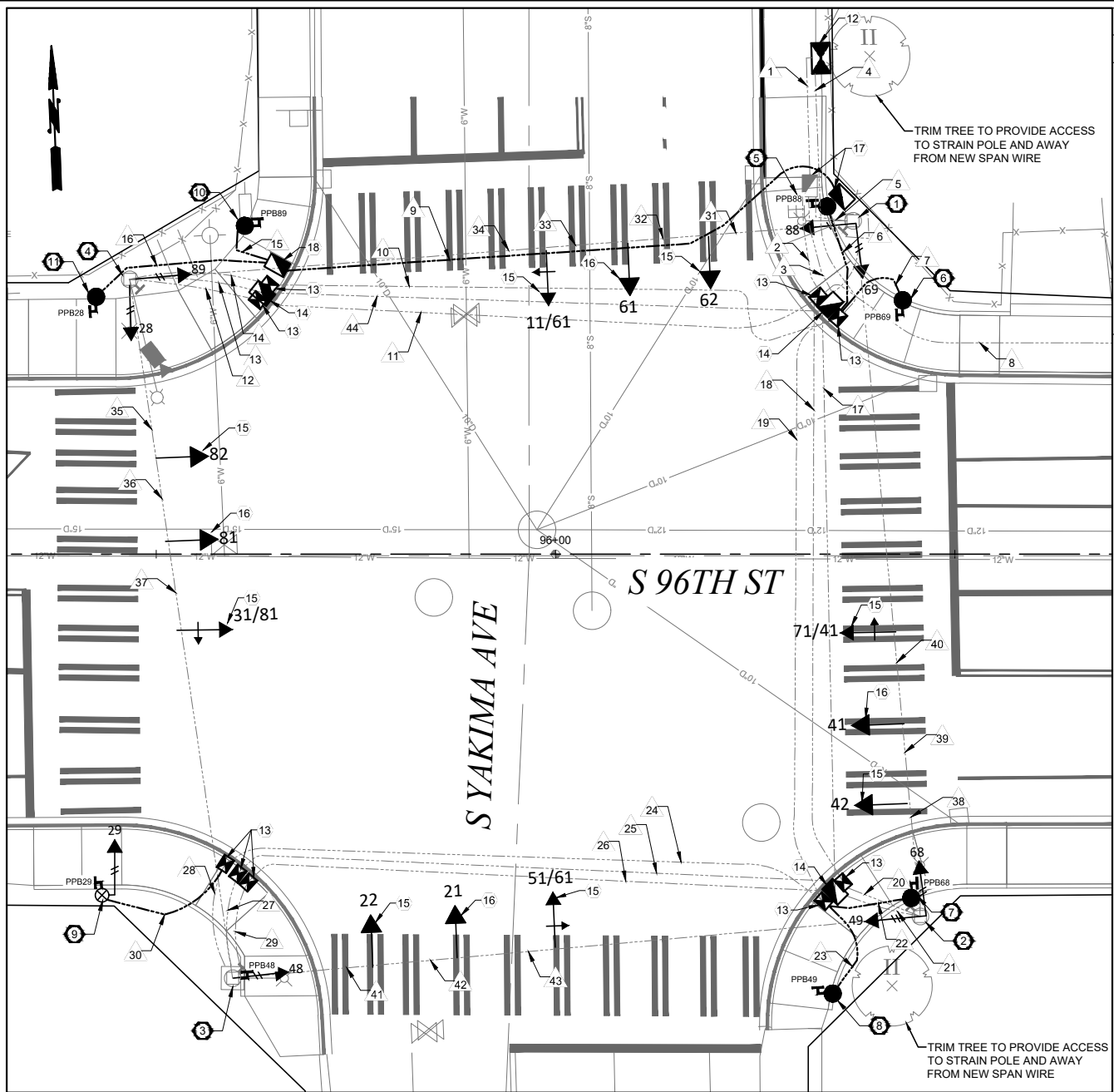
PWK-G0037

SHEET NO. 16

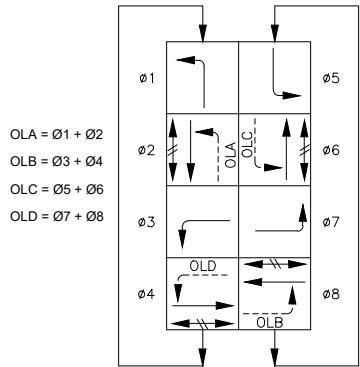
SHEET SG-4 OF SG-8

DocuSigned by:
Chris Larson

93687DCBCCFF4F8..



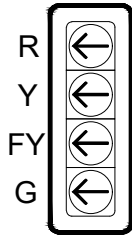
SIGNAL PHASING



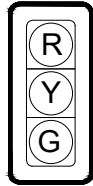
OLA = Ø1 + Ø2
OLB = Ø3 + Ø4
OLC = Ø5 + Ø6
OLD = Ø7 + Ø8

----- PERMISSIVE MOVEMENT
→ PROTECTED MOVEMENT
↔ PEDESTRIAN MOVEMENT

SIGNAL DISPLAYS



VEHICLE HEADS:
11/21, 31/41,
51/61, & 71/81



VEHICLE HEADS:
21, 22 41, 42,
61, 62, 81, & 82

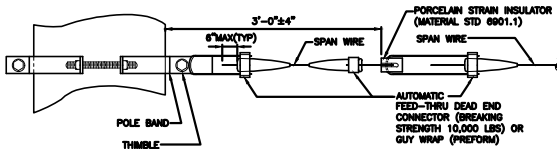


COUNTDOWN
PEDESTRIAN HEADS:
28, 29, 48, 49
68, 69, 88, & 89

SIGNAL LEGEND

DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL
CONSTRUCTION NOTE	#	PEDESTRIAN PUSHBUTTON	-1
SIGNAL POLE CONSTRUCTION NOTE	#	VIDEO DETECTION CAMERA	
WIRE NOTE	#	TYPE 1 JUNCTION BOX	
TYPE PPB POST W/PUSHBUTTON(S)		TYPE 2 JUNCTION BOX	
SIGNAL POLE WITH MAST ARM		TYPE 8 JUNCTION BOX	
TYPE 1 SIGNAL POLE	⊗	PULL BOX	
VEHICLE SIGNAL HEAD	→	EXISTING JUNCTION BOX	
PEDESTRIAN SIGNAL HEAD	↔	CONTROLLER CABINET	
EMERGENCY PREEMPTION DETECTOR	⊗	SERVICE PEDESTAL	
EXISTING STRAIN POLE (WITH LUMINAIRE)	⊗	CONDUIT	
MAST ARM MOUNTED SIGN	T		

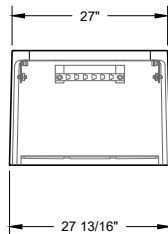
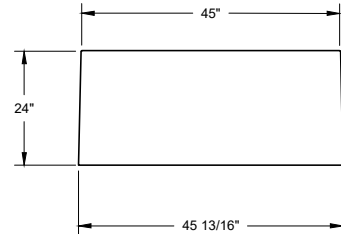
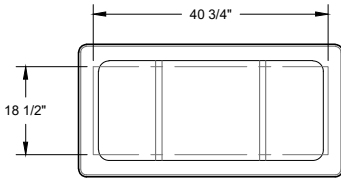
SPAN WIRE INSTALLATION DETAIL



- NOTES:
1. ALL STEEL HARDWARE TO BE HOT DIP GALVANIZED OR STAINLESS STEEL UNLESS OTHERWISE STIPULATED IN THE DRAWINGS.
2. SPAN WIRE MUST BE ALUMINUM COATED STEEL.
3. SPREAD THIMBLE TO FIT THE BAIL OF THE AUTOMATIC DEAD END.

TRAFFIC SIGNAL CONTROL BASE DETAIL

1. PROVIDE A TRAFFIC SIGNAL CONTROLLER BASE (CABINET BASE) MANUFACTURED OF POLYMER CONCRETE MATERIAL CONSISTING OF CALCAREOUS AND SILICEOUS STONE, GLASS FIBERS AND THERMOSET POLYESTER RESIN. THE POLYMER CONCRETE CABINET BASE SHALL BE REINFORCED ON THE INSIDE OF THE CABINET BASE WITH FIBERGLASS MATTING.
2. THE POLYMER CONCRETE MATERIAL MUST HAVE A MINIMUM COMPRESSIVE STRENGTH OF 10,300 POUNDS PER SQUARE INCH (PSI), MINIMUM FLEXURAL STRENGTH OF 3600 PSI, AND MINIMUM SHEAR STRENGTH OF 3600 PSI.
3. SUPPLY THE CABINET BASE WITH FOUR 1/2"-13 UNC STAINLESS STEEL INSERTS FOR ATTACHMENT OF THE CABINET TO THE BASE. INSERTS MUST A MINIMUM TORQUE OF 50 FT-LB AND A MINIMUM STRAIGHT PULL OUT STRENGTH OF 750 LBS.
4. PROVIDE THE CABINET BASE WITH 4 CABLE RACKS MOUNTED ONE ON EACH SIDE OF THE BASE 2" TO 7" FROM THE TOP EDGE OF THE BASE. UNLESS APPROVED OTHERWISE, CABLE RACKS MUST BE 1-1/2 X 9/16X 3/16INCH STEEL CHANNEL WITH EIGHT T-SLOTS SPACED AT 1-1/2 INCHES. THE CABLE RACKS MUST EASILY ACCOMMODATE THE INSERTION OF THE WRAPS TO ATTACH FIELD WIRING TO THE RACKS TO SERVE AS STRAIN RELIEF. SECURE CABLE RACKS TO THE BASE USING 1/2"-13 UNC STAINLESS STEEL SCREWS AND INSERTS.
5. THE CABINET BASE, WHEN SECURED TO THE CONCRETE SLAB WITH CONTROLLER CABINET ATTACHED, MUST WITHSTAND A MINIMUM WIND LOAD OF 125 MPH OR A 850 LB FORCE APPLIED AT 49" ABOVE THE BOTTOM OF THE BASE WITHOUT CAUSING THE BASE OR CABINET TO COME OUT OF THEIR ANCHORED POSITION OR CAUSE ANY PERMANENT DEFORMATION. PROVIDE THE CABINET BASE WITH HARDWARE FOR ATTACHMENT TO A CONCRETE SLAB.
6. THE TRAFFIC SIGNAL BASE MUST BE PERMANENTLY MARKED EITHER BY IMPRESS OR BY PERMANENT INK WITH THE MANUFACTURER'S MODEL NUMBER AND NAME OR LOGO.
7. SEAL THE BASE TO THE CONCRETE WITH A SILICONE CAULK BEAD AND FASTENED TO THE SLAB PER MANUFACTURER'S INSTRUCTIONS.
8. FILL POLYMERCONCRETE BASE WITH 12 INCHES OF QUICK-SETTING CONCRETE TO LOCK BASE IN PLACE OVER THE EXISTING M-SIZE SIGNAL CABINET FOUNDATION.



GENERAL NOTES

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- 2 THE CONTRACTOR SHALL PROVIDE ALL MATERIALS SUBMITTALS TO THE CITY ENGINEER FOR CITY APPROVAL PRIOR TO START OF CONSTRUCTION.
- 3 THE LOCATION OF ALL CONDUIT AND JUNCTION BOXES ON THIS PLAN ARE FOR GRAPHICAL PRESENTATION ONLY. FINAL LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER IN THE FIELD.
- 4 CONTRACTOR SHALL COORDINATE ALL TRAFFIC SIGNAL RELATED WORK WITH CITY OF TACOMA TRAFFIC MAINTENANCE SHOP (253) 591-5287.
- 5 ALL CONDUITS SHALL BE INSPECT BY THE TRAFFIC SIGNAL INSPECTOR PRIOR TO BACKFILL OF TRENCHES.
- 6 CONTRACTOR SHALL COORDINATE WITH THE ENGINEER AND CITY OF TACOMA TRAFFIC MAINTENANCE REPRESENTATIVES TO DETERMINE SUITABLE DETECTION ZONES.
- 7 CONTRACTOR SHALL SALVAGE ALL EXISTING METAL POLES TO THE CITY.
- 8 EXISTING FEATURES TO REMAIN UNLESS OTHERWISE NOTED.
- 9 ALL WORK SHALL BE CONSISTENT WITH UTILITY AGENCY REQUIREMENTS. THE CONTRACTOR SHALL CONTACT ALL PERTINENT UTILITY AGENCIES 48 HOURS BEFORE COMMENCING WORK AND SHALL COORDINATE WITH AFFECTED UTILITY AGENCIES THROUGHOUT THE PROJECT.
- 10 THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO EXISTING UTILITIES. THE CONTRACTOR SHALL NOTIFY THE AFFECTED UTILITY COMPANY AND THE CITY IMMEDIATELY UPON DAMAGE.
- 11 A TRAFFIC SIGNAL SHOP REPRESENTATIVE SHALL BE PRESENT FOR ALL WORK OCCURRING WITH IN THE TRAFFIC SIGNAL CABINET. ONLY JOURNEY LEVEL WORK SHALL TAKE PLACE WITHIN THE TRAFFIC SIGNAL CABINET.
- 12 SPARE 5C CABLES ARE PRESENT ON EACH SPAN WIRE. CABLES CAN BE REMOVED IF MORE SPACE IS NEEDED IN CONDUITS TO PULL WIRE.
- 13 ALL UNUSED TRAFFIC SIGNAL CABLES TO BE REMOVED AFTER COMPLETION OF PROJECT.

CONSTRUCTION NOTES

- 1 A REMOVE TWO EXISTING PEDESTRIAN PUSHBUTTONS.
B REMOVE TWO EXISTING PEDESTRIAN HEADS. FURNISH AND INSTALL TWO COUNTDOWN PEDESTRIAN HEAD WITH NEW CLAMSHELL (TYPE E) MOUNT ON EXISTING STRAIN POLE.
C INSTALL NEW TERMINAL CABINET ON EXISTING STRAIN POLE.
D PLUG UNUSED HOLES IN POLE.
E INSTALL NEW SPAN WIRE FOR NEW SIGNAL HEADS PER COT STANDARD PLAN TS-02 AND SPAN WIRE INSTALLATION DETAIL THIS SHEET.
- 2 A REMOVE TWO EXISTING PEDESTRIAN PUSHBUTTONS.
B REMOVE TWO EXISTING PEDESTRIAN HEADS. FURNISH AND INSTALL TWO COUNTDOWN PEDESTRIAN HEAD WITH NEW CLAMSHELL (TYPE E) MOUNT ON EXISTING STRAIN POLE.
C INSTALL NEW TERMINAL CABINET ON EXISTING STRAIN POLE.
D PLUG UNUSED HOLES IN POLE.
E INSTALL NEW SPAN WIRE FOR NEW SIGNAL HEADS PER COT STANDARD PLAN TS-02 AND SPAN WIRE INSTALLATION DETAIL THIS SHEET.
- 3 A REMOVE TWO EXISTING PEDESTRIAN PUSHBUTTONS. FURNISH AND INSTALL ONE APS PUSH BUTTON WITH PUSH BUTTON EXTENSION. PUSH BUTTON TO BE WITHIN 10 INCHES OF RAMP LANDING.
B REMOVE TWO EXISTING PEDESTRIAN HEADS. FURNISH AND INSTALL ONE COUNTDOWN PEDESTRIAN HEAD WITH NEW CLAMSHELL (TYPE E) MOUNT ON EXISTING STRAIN POLE.
C INSTALL NEW TERMINAL CABINET ON EXISTING STRAIN POLE.
D PLUG UNUSED HOLES IN POLE.
E INSTALL NEW SPAN WIRE FOR NEW SIGNAL HEADS PER COT STANDARD PLAN TS-02 AND SPAN WIRE INSTALLATION DETAIL THIS SHEET.
- 4 A REMOVE TWO EXISTING PEDESTRIAN PUSHBUTTONS.
B REMOVE TWO EXISTING PEDESTRIAN HEADS. FURNISH AND INSTALL TWO COUNTDOWN PEDESTRIAN HEAD WITH NEW CLAMSHELL (TYPE E) MOUNT ON EXISTING STRAIN POLE.
C INSTALL NEW TERMINAL CABINET ON EXISTING STRAIN POLE.
D PROTECT EXISTING GRIDSMART CAMERA.
E PLUG UNUSED HOLES IN POLE.
F INSTALL NEW SPAN WIRE FOR NEW SIGNAL HEADS PER COT STANDARD PLAN TS-02 AND SPAN WIRE INSTALLATION DETAIL THIS SHEET.
- 5 A FURNISH AND INSTALL CURB MOUNTED PEDESTRIAN PUSH BUTTON POST WITH BREAKAWAY STYLE CONNECTORS.
B FURNISH AND INSTALL ONE APS PUSH BUTTON. PUSH BUTTON TO BE WITHIN A 10 INCH REACH OF RAMP LANDING.
- 6 A FURNISH AND INSTALL CURB MOUNTED PEDESTRIAN PUSH BUTTON POST WITH BREAKAWAY STYLE CONNECTORS.
B FURNISH AND INSTALL ONE APS PUSH BUTTON. PUSH BUTTON TO BE WITHIN A 10 INCH REACH OF RAMP LANDING.
- 7 A FURNISH AND INSTALL CURB MOUNTED PEDESTRIAN PUSH BUTTON POST WITH BREAKAWAY STYLE CONNECTORS.
B FURNISH AND INSTALL ONE APS PUSH BUTTON. PUSH BUTTON TO BE WITHIN A 10 INCH REACH OF RAMP LANDING.
- 8 A FURNISH AND INSTALL A CURB MOUNTED PEDESTRIAN PUSH BUTTON POST WITH BREAKAWAY STYLE CONNECTORS.
B FURNISH AND INSTALL ONE APS PUSH BUTTON. PUSH BUTTON TO BE WITHIN A 10 INCH REACH OF RAMP LANDING.
- 9 A FURNISH AND INSTALL TYPE 1 SIGNAL POLE WITH ONE BREAKAWAY STYLE CONNECTORS.
B FURNISH AND INSTALL COUNTDOWN PEDESTRIAN SIGNAL HEAD WITH CLAMSHELL MOUNT (TYPE E)
C FURNISH AND INSTALL ONE NEW APS PUSH BUTTON
- 10 A FURNISH AND INSTALL CURB MOUNTED PEDESTRIAN PUSH BUTTON POST WITH BREAKAWAY STYLE CONNECTORS.
B FURNISH AND INSTALL ONE APS PUSH BUTTON. PUSH BUTTON TO BE WITHIN A 10 INCH REACH OF RAMP LANDING.
- 11 A FURNISH AND INSTALL PEDESTRIAN PUSH BUTTON POST WITH BREAKAWAY STYLE CONNECTORS.
B FURNISH AND INSTALL ONE APS PUSH BUTTON. PUSH BUTTON TO BE WITHIN A 10 INCH REACH OF RAMP LANDING.
- 12 A REPLACE EXISTING TRAFFIC SIGNAL CABINET NEW P-44 TS-2 TRAFFIC SIGNAL CABINET WITH NEW SIEMENS M-62 CONTROLLER AND ALL CABINET APPURTENANCES.
B INSTALL TRAFFIC SIGNAL CABINET ON POLYMER CONCRETE BASE OVER EXISTING CONCRETE BASE AS NOTED ON TRAFFIC CONTROL BASE DETAIL THIS SHEET.
C THE FOLLOWING EQUIPMENT SHALL BE TRANSFERRED TO THE NEW CABINET
 - ACTELIS NETWORK SWITCH
 - GRIDSMART PROCESSOR
- 13 A REPLACE EXISTING JUNCTION BOX WITH NEW TYPE 1 JUNCTION BOX PER WSDOT STANDARD PLAN J-40.10 AND CITY OF TACOMA STANDARD PLAN TS-08.
- 14 A REPLACE EXISTING JUNCTION BOX WITH NEW TYPE 2 JUNCTION BOX PER WSDOT STANDARD PLAN J-40.10 AND CITY OF TACOMA STANDARD PLAN TS-08.
- 15 A REMOVE EXISTING TRAFFIC SIGNAL HEAD AND INSTALL NEW TRAFFIC SIGNAL HEAD WITH 12 INCH INDICATIONS, BACK PLATE, AND 1 INCH REFLECTIVE BOARDER PER SIGNAL DISPLAY AND PHASING DIAGRAM THIS SHEET. INSTALL NEW 5C CABLE TO NEW TERMINAL CABINET ON POLE. INSTALL SIGNAL HEAD ON NEW SPAN WIRE PER CITY OF TACOMA STANDARD PLANS TS-01, TS-02, AND DETAIL ON THIS SHEET.
- 16 A REMOVE EXISTING TRAFFIC SIGNAL HEAD AND INSTALL NEW TRAFFIC SIGNAL HEAD WITH 12 INCH INDICATIONS, BACK PLATE, AND 1 INCH REFLECTIVE BOARDER PER SIGNAL DISPLAY AND PHASING DIAGRAM THIS SHEET. INSTALL NEW 5C CABLE JUMPER TO MATCHING SIGNAL HEAD ON SPAN. INSTALL SIGNAL HEAD ON NEW SPAN WIRE PER CITY OF TACOMA STANDARD PLANS TS-01, TS-02, AND DETAIL ON THIS SHEET.
- 17 A REMOVE EXISTING JUNCTION BOX AND INSTALL NEW JUNCTION BOX BEHIND PEDESTRIAN CURB. EXTEND EXISTING CONDUITS (RUNS 1, 2, 3, AND 5) TO NEW JUNCTION BOX LOCATION. PROTECT EXISTING TRAFFIC SIGNAL WIRING.
- 18 A FURNISH AND INSTALL TYPE 2 JUNCTION BOX PER WSDOT STANDARD PLAN J-40.10 AND CITY OF TACOMA STANDARD PLAN TS-08.

CALL BEFORE YOU DIG

EXISTING UTILITIES ARE SHOWN IN APPROXIMATE LOCATIONS ONLY PER BEST AVAILABLE INFO, AND MAY BE INCOMPLETE. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING, POTHOLING AND AVOIDING ALL EXISTING UTILITIES.

CALL TWO BUSINESS DAYS BEFORE YOU DIG
(1-800-424-5555) OR VISIT ONLINE: www.callbeforeyoudig.org



ADDENDUM 1

NO REVISION

11/22/21 KDN

FINAL CONSTRUCTION CHECKED

DATE NOV 2021

SCALE 1" = 10'

DESIGNED RDR

CHECKED DC

DRAWN COB

PROJECT NAME HSPYak-SIG

FIELD BOOKS

DRAWING NAME HSPYak-SIG



DocuSigned by:

Chris Larson

93687DCBBCFF4F8..

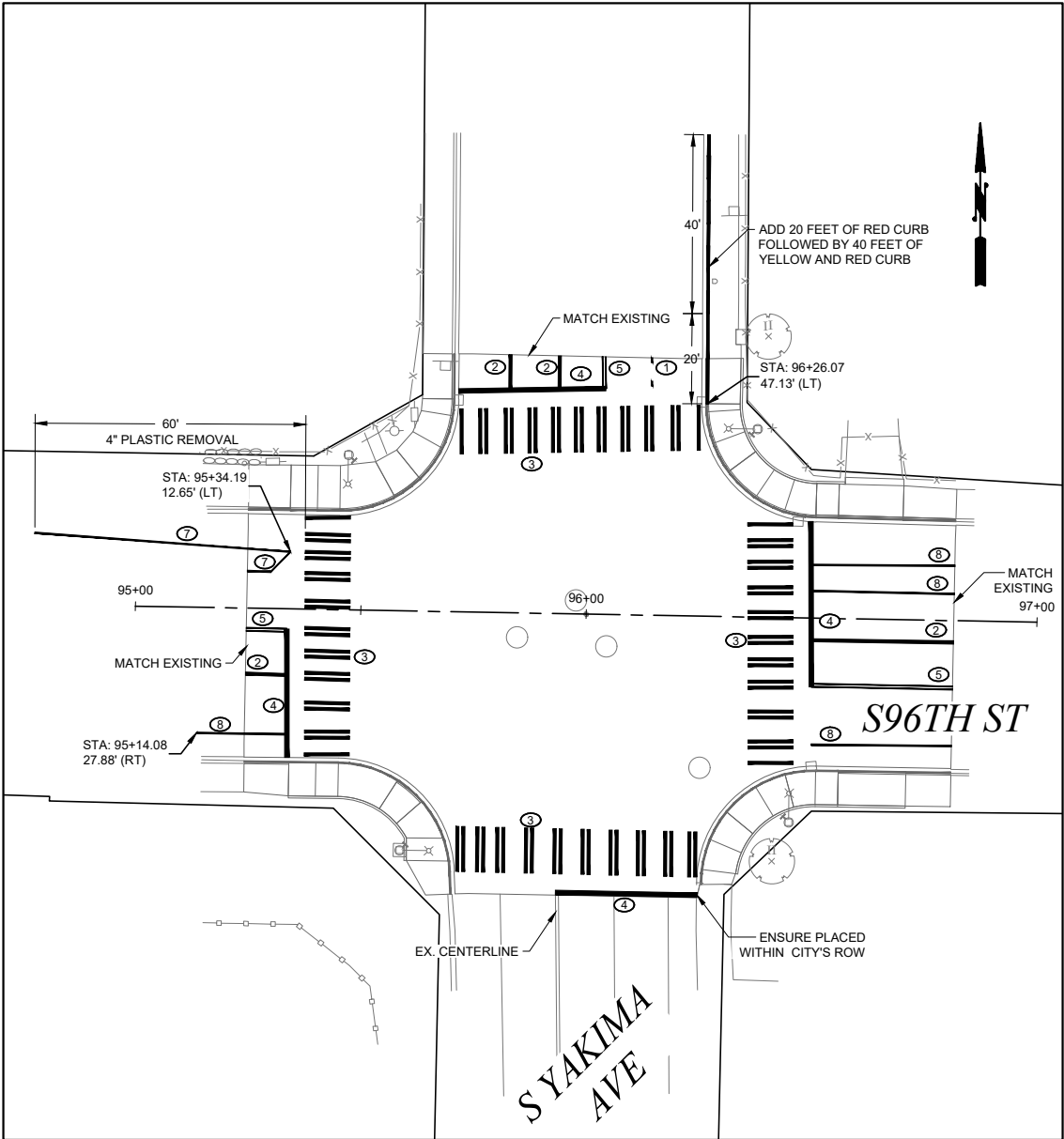
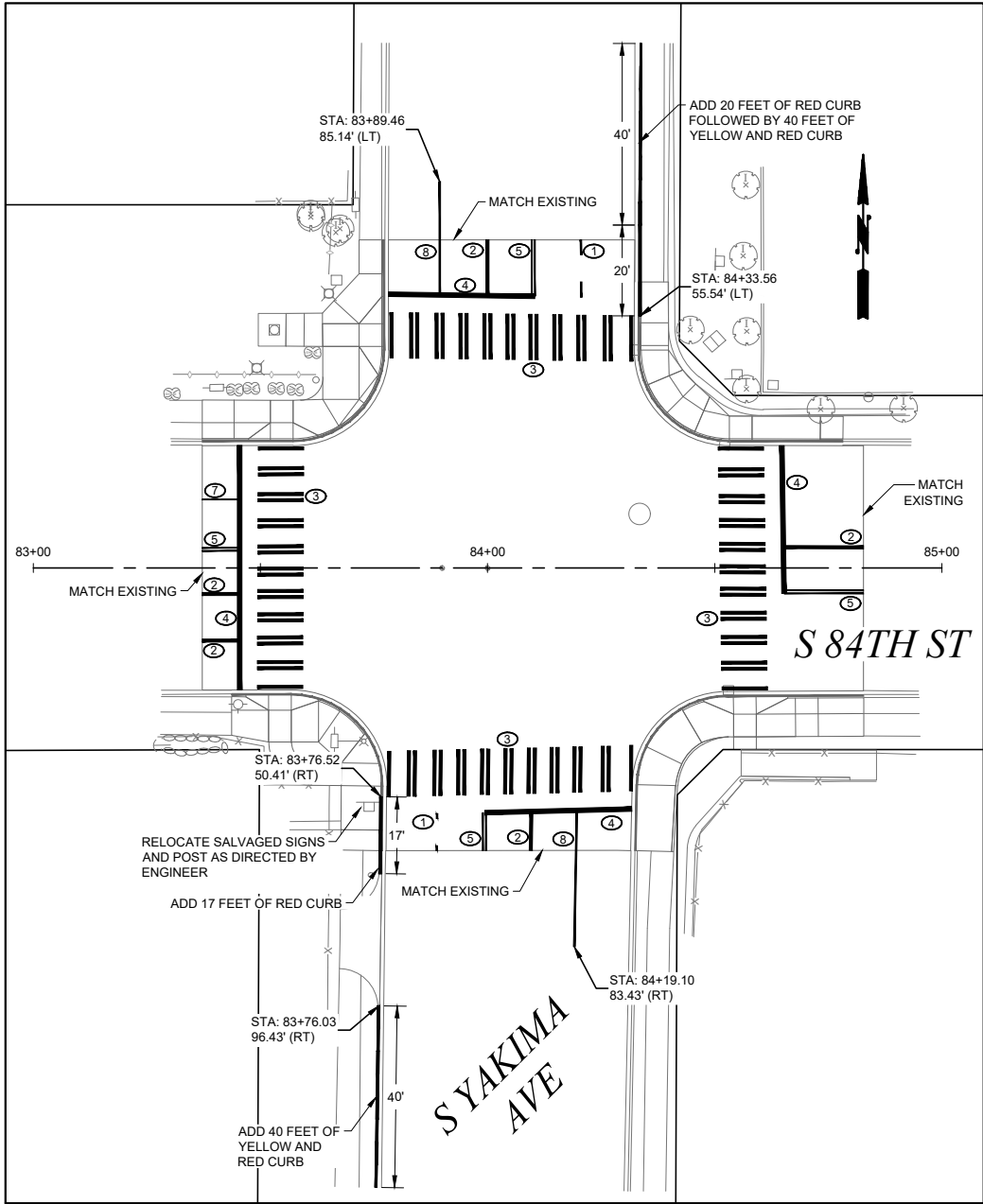
CITY OF TACOMA
DEPARTMENT OF PUBLIC WORKS

SIGNAL PLAN
SOUTH YAKIMA SIGNAL AND SAFETY IMPROVEMENTS
S YAKIMA ST @ S 96TH ST

PWK-G0037

SHEET NO. 19

SHEET SG-7 OF SG-8



- SEE THIS SHEET FOR GENERAL NOTES
RELATING TO CHANNELIZATION AND
SIGNING
- CHANNELIZATION NOTES
- 6" WHITE BIKE LANE SKIP LINE, THERMOPLASTIC, PER STD. PLAN CH-03B
 - 8" WHITE GORE LINE, THERMOPLASTIC, PER COT STD. PLAN CH-03A
 - PEDESTRIAN CROSSWALK, THERMOPLASTIC, PER COT STD. PLAN CH-02
 - 12" WHITE STOP BAR, THERMOPLASTIC, PER COT STD. PLAN CH-02
 - DOUBLE YELLOW CENTER LINE, THERMOPLASTIC, PER COT STD. PLAN CH-03A & CH-09
 - WHITE TURN LANE ARROW, THERMOPLASTIC, PER COT STD. PLANS CH-09 & CH-10 (8-FT TYPE)
 - WHITE EDGE (OR LANE SKIP SEGMENT) LINE, THERMOPLASTIC, 4" PER COT STD. PLAN CH-03A
 - 6" WHITE BIKE LANE STRIPE, THERMOPLASTIC

- GENERAL SIGNING NOTES
- THE CITY OF TACOMA TRAFFIC ENGINEERING SECTION SHALL BE NOTIFIED AT LEAST THREE (3) BUSINESS DAYS PRIOR TO STARTING ANY SIGNING WORK.
 - TEMPORARY TRAFFIC CONTROL SHALL CONFORM TO THE MOST RECENT EDITION OF THE CITY OF TACOMA TRAFFIC CONTROL HANDBOOK, THE MUTCD, AND/OR AS DIRECTED BY THE CITY OF TACOMA.
 - ALL SIGNS SHALL CONFORM TO THE MUTCD WITH RESPECT TO COLORS, SHAPE, SIZE, CONTENT, RETROREFLECTIVITY, AND PLACEMENT RELATIVE TO THE ROADWAY. ALL SIGN PANELS SHALL BE 0.080-INCH THICK ALUMINUM (NON-RECYCLED) WITH PRISMATIC SHEETING (TYPE IV OR BETTER, OR AS SPECIFIED). SIGN POSTS SHALL BE 2-INCH SQUARE PERFORATED GALVANIZED STEEL TUBING PER CITY STANDARD PLANS, UNLESS OTHERWISE SPECIFIED.
 - THE CONTRACTOR SHALL SUBMIT ALL SIGN FORMATS/LAYOUTS (WITH DIMENSIONS) TO THE CITY'S TRAFFIC ENGINEERING SECTION FOR APPROVAL PRIOR TO FABRICATION.
 - ANY TRAFFIC SIGNS, INCLUDING STREET NAME SIGNS, WHICH ARE IN CLOSE PROXIMITY TO AN EXISTING OR PROPOSED STREET LIGHT POLE (CONFER WITH TRAFFIC ENGINEERING IN ADVANCE FOR APPROVAL), SHALL BE PROPERLY MOUNTED TO THE POLE INSTEAD OF INSTALLING A NEW SIGN POST. ANY ADDED EXPENSE RELATING TO A NEED FOR DIFFERENT MOUNTING HARDWARE AND/OR EQUIPMENT SHALL BE THE CONTRACTOR'S RESPONSIBILITY. PRIOR TO INSTALLATION, SIGN LOCATIONS AND OFFSETS MAY BE ADJUSTED BY THE CITY TO IMPROVE VISIBILITY OR SAFETY.
 - ANY EXISTING SIGNS THAT NEED TO BE REMOVED AS A RESULT OF CONSTRUCTION, OR DUE TO CONFLICT WITH INSTALLED SIGNS, SHALL BE DONE SO BY THE CONTRACTOR AT THEIR EXPENSE. THESE SIGNS SHALL BE REMOVED, PROTECTED, AND STORED FOR POSSIBLE REINSTALLATION BY THE CONTRACTOR OR FOR SALVAGING AND RETURNING TO THE CITY. SIGNS DAMAGED DURING CONSTRUCTION SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
 - THE CONTRACTOR SHALL ENSURE THAT AT NO TIME A TRAFFIC SIGN IS INSTALLED IN SUCH A WAY AS TO BE BLOCKED BY TREES OR VEGETATION, EITHER EXISTING OR PENDING. ALL SIGN LOCATIONS SHALL NOT INTERFERE WITH PEDESTRIAN MOVEMENT AS DEFINED BY THE AMERICANS WITH DISABILITIES ACT (ADA) AND/OR PUBLIC RIGHTS-OF-WAY ACCESSIBILITY GUIDELINES (PROWAG). IN BOTH OF THESE CASES, THE CONTRACTOR SHALL CONTACT THE TRAFFIC ENGINEERING SECTION TO PROVIDE AN ALTERNATE LOCATION FOR THE INSTALLATION OF THE SIGN(S) IN QUESTION.
 - TEMPORARY SIGNS INSTALLED FOR CONSTRUCTION PURPOSES SHALL BE TO BE MOUNTED IN THE LEAST INTRUSIVE LOCATIONS AND MANNER AS POSSIBLE TO MINIMIZE DAMAGE TO SIDEWALKS OR BLOCKING OF OTHER SIGNS/TRAFFIC CONTROL DEVICES. USE OF EXISTING SIGN POSTS AND STREET LIGHT POLES IS PREFERRED. ANY DAMAGE TO CITY INFRASTRUCTURE CAUSED BY TEMPORARY SIGN INSTALLATIONS SHALL BE RESTORED UPON REMOVAL OF THE TEMPORARY SIGN/POST.

- GENERAL CHANNELIZATION
NOTES
- THE CITY OF TACOMA TRAFFIC ENGINEERING SECTION SHALL BE NOTIFIED AT LEAST THREE (3) BUSINESS DAYS PRIOR TO STARTING ANY STRIPING WORK.
 - UNLESS OTHERWISE SPECIFIED, ALL PAVEMENT MARKING INSTALLATIONS AND REMOVALS SHALL CONFORM TO THE REQUIREMENTS SET FORTH IN THE CITY'S SPECIFICATIONS. ITEMS NOT COVERED UNDER THE CITY SPECIFICATIONS SHALL CONFORM TO THE WSDOT/APWA STANDARD SPECIFICATIONS AND THE MOST RECENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) AS ADOPTED AND MODIFIED BY WASHINGTON ADMINISTRATIVE CODE (WAC) 468-95.
 - TEMPORARY TRAFFIC CONTROL SHALL CONFORM TO THE MOST RECENT EDITION OF THE CITY OF TACOMA TRAFFIC CONTROL HANDBOOK, THE MUTCD, AND/OR AS DIRECTED BY THE CITY OF TACOMA.
 - THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LAYOUT AND INSTALLATION OF THE PERMANENT PAVEMENT MARKINGS. PAVEMENT MARKING DIMENSIONS ARE TO THE CENTER OF THE STRIPE FOR SINGLE-LINE STRIPING AND TO THE CENTER OF THE GAP BETWEEN THE TWO LINES FOR DOUBLE-LINE STRIPING. WHERE CURB AND GUTTER ARE PRESENT, DIMENSIONS ARE TO THE FACE OF CURB, OR TO THE EDGE OF PAVEMENT ABSENT CURB AND GUTTER. THE CONTRACTOR SHALL SCHEDULE INSPECTION OF THE PAVEMENT MARKING LAYOUT AT LEAST THREE (3) BUSINESS DAYS PRIOR TO THE INSTALLATION OF THE PERMANENT PAVEMENT MARKING. INSPECTION SHALL TAKE PLACE DURING DAYTIME AND ON A BUSINESS DAY PRIOR TO INSTALLATION OF PERMANENT PAVEMENT MARKINGS. ANY PERMANENT PAVEMENT MARKINGS APPLIED PRIOR TO FIELD INSPECTION BY THE TRAFFIC ENGINEERING SECTION SHALL BE REMOVED AND RE-STRIPED AT THE CONTRACTOR'S EXPENSE.
 - THE CONTRACTOR SHALL FOLLOW ALL DIMENSIONS, NOTES, DETAILS, AND STANDARDS WHEN INSTALLING PAVEMENT STRIPING, MARKINGS, AND MARKERS. THE CHANNELIZATION PLANS MAY BE MODIFIED AS DIRECTED BY THE CITY TRAFFIC ENGINEER. THE CONTRACTOR SHALL REFER ANY QUESTIONS CONCERNING PAVEMENT MARKINGS TO THE TRAFFIC ENGINEERING SECTION VIA THE CITY'S CONSTRUCTION INSPECTOR FOR THE PROJECT.
 - GENERALLY, RAISED PAVEMENT MARKERS (RPMS) SHALL BE INSTALLED IN CONJUNCTION WITH STRIPING EFFORTS AND IN ACCORDANCE WITH CITY OF TACOMA STANDARD PLANS. EXCEPTIONS ARE POSSIBLE. COORDINATE WITH THE CITY'S TRAFFIC ENGINEERING SECTION. ALL MARKERS SHALL BE INSTALLED SO THAT THE REFLECTIVE FACE OF EACH MARKER IS FACING THE DIRECTION OF APPROACHING TRAFFIC AND IS PERPENDICULAR TO THE DIRECTION OF TRAFFIC FLOW.
 - THE CONTRACTOR SHALL REMOVE ALL EXISTING PAVEMENT MARKINGS AND STRIPING IN CONFLICT WITH OR CONTRARY TO THE FINAL STRIPING PLAN BY HYDRO-BLASTING OR OTHER APPROVED NONINVASIVE METHOD. ALL REMOVAL METHODS SHALL BE DONE IN CONFORMANCE WITH WSDOT/APWA STANDARD SPECIFICATIONS. IF THE REMOVAL DAMAGES THE UNDERLYING PAVEMENT AS DESCRIBED IN THE WSDOT/APWA STANDARD SPECIFICATIONS, THEN THE PAVEMENT SHALL BE RESTORED TO A STATE EQUALING OR EXCEEDING ITS PREVIOUS STATE. IF THE OBLITERATION CAUSES SHADOWING (OR "GHOST" MARKINGS), OR IN THE OPINION OF THE CITY TRAFFIC ENGINEER WILL CAUSE CONFUSION TO DRIVERS, THE CONTRACTOR SHALL REMEDY THROUGH AN APPROVED MEANS AND METHOD. APPLYING ADDITIONAL MARKINGS TO OBFUSCURE ERRONEOUS MARKINGS IS NOT AN APPROVED METHOD FOR OBLITERATION. STRIPING OBLITERATION MAY NEED TO EXCEED THE CITY OF TACOMA, RIGHT-OF-WAY DESIGN MANUAL ISSUED: JANUARY 7, 2016 CHAPTER 7 7-14 ERRATA VERSION JULY 2016 PROJECT LIMITS SO THAT THE NEW STRIPING WILL MATCH PERMANENT EXISTING PAVEMENT MARKINGS.
 - THE CONTRACTOR SHALL CLEAN THE ROADWAY SURFACE TO THE SATISFACTION OF THE CITY BY POWER BROOM, STREET SWEEPING, AIR JET BLOWING, AND/OR WATER JET/TRUCK PRIOR TO THE PLACEMENT OF ALL PAVEMENT MARKINGS UNLESS DIRECTED OTHERWISE. THE ROAD PAVEMENT SURFACE CONDITIONS, INCLUDING ANY PAVEMENT CURING TIMES, SHALL BE IN ACCORDANCE WITH THE WSDOT/APWA STANDARD SPECIFICATIONS PRIOR TO THE APPLICATION OF PERMANENT PAVEMENT MARKINGS.
 - PERMANENT PAVEMENT MARKINGS SHOULD BE FULLY IMPLEMENTED BEFORE ALLOWING PUBLIC USE OF THE ROADWAY. TEMPORARY PAVEMENT MARKINGS CONTROLLING TRAFFIC AS INTENDED BY THE PERMANENT CHANNELIZATION PLANS MAY BE PERMISSIBLE IN THE CASE WHERE PAVEMENT CONDITIONS/MATERIALS PRECLUDE IMPLEMENTATION OF THE PERMANENT PAVEMENT MARKINGS UNTIL A LATER TIME. TEMPORARY MARKINGS SHALL NOT BE USED ANY LONGER THAN NECESSARY AND NO LONGER THAN ONE (1) MONTH UNLESS OTHERWISE APPROVED OR MITIGATED, WHICH MAY INCLUDE A RE-APPLICATION OF THE TEMPORARY MARKINGS.

CALL BEFORE YOU DIG
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CALL TWO BUSINESS DAYS BEFORE YOU DIG
(1-800-424-5555) OR VISIT ONLINE: www.callbeforeyoudig.org



ADDENDUM 1

11/22/21 BDK

FINAL
CONSTRUCTION
CHECKED

DATE
NOV 2021

SCALE
1" = 20'

DESIGNED
BDK

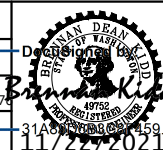
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PROJECT NAME
HSIP-SYAK72-7

FIELD BOOKS

DRAWING NAME
HSIPyak-CHANN



CITY OF TACOMA
DEPARTMENT OF PUBLIC WORKS

CHANNELIZATION PLANS
SOUTH YAKIMA SIGNAL AND SAFETY IMPROVEMENTS
S YAKIMA ST @ S 84TH ST/S 94TH ST

PWK-G0037

SHEET NO.
21

SHEET CH-1 OF CH-1

DocuSigned by:

Chris Larson

93687DCB0CFF4F8...

BID PROPOSAL

SPECIFICATION NO. **PW21-0719F ADDENDUM 1**

South Yakima Signal and Safety Improvements

The undersigned hereby certifies that he/she has examined the location and construction details of work as outlined on the Plans and Specifications for Project No. **PWK-G0037** and has read and thoroughly understands the Plans and Specifications and contract governing the work embraced in this improvement and the method by which payment will be made for said work, and hereby proposes to undertake and complete the work embraced in this improvement in accordance with said Plans, Specifications and contract and at the following schedule of rates and prices:

- NOTE:
1. Unit prices of all items, all extensions and total amount of bid should be shown. Show unit prices in figures only.
 2. The notations below the item numbers refer to the specification section where information may be found regarding each contract item. These notations are intended only as a guide and are not warranted to refer to all specification sections where information may be found.

The bid items are grouped as follows:

Group R: Roadway Bid Items

Group L: Lump Sum Bid Items

Summarize totals as indicated on the pages that follow below:

Contractor's Name: _____
Specification Number: **PW21-0719F ADDENDUM 1**
South Yakima Signal and Safety Improvements

Group-R: South Yakima Signal and Safety Improvements
Roadway Bid Items R-1 through R-25
Specification No. PW21-0719F ADDENDUM 1

ITEM NO.	ITEM DESCRIPTION	ESTIMATE QUANTITY	UNIT PRICE	TOTAL AMOUNT
R- 1 2-14	Remove Existing Pavement, Type I, Class A8, per square yard	350 SY	\$ _____	\$ _____
R- 2 2-14	Remove Existing Pavement, Type I, Class C6, per square yard	380 SY	\$ _____	\$ _____
R- 3 2-15	Remove Curb, per linear foot	570 LF	\$ _____	\$ _____
R- 4 4-04	Recycled Concrete Aggregate, per ton	260 TN	\$ _____	\$ _____
R- 5 5-04	Planing Bituminous Pavement, per square yard	2,470 SY	\$ _____	\$ _____
R- 6 5-04	Fiber Reinforced HMA CL 1/2" PG 58H-22, per ton	410 TN	\$ _____	\$ _____
R- 7 5-04	Temporary Pavement Patch, per ton	40 TN	\$ _____	\$ _____
R- 8 7-05	Adjust Existing Catch Basin, Furnish New Frame and Grate, per each	7 EA	\$ _____	\$ _____
R- 9 7-05	Adjust Existing Manhole, Furnish New Frame and Cover, per each	5 EA	\$ _____	\$ _____
R- 10 7-05	Adjust Existing Valve Chamber to Grade, per each	10 EA	\$ _____	\$ _____
R- 11 8-04	Cement Conc. Traffic Curb and Gutter, per linear foot	590 LF	\$ _____	\$ _____
R- 12 8-06	Cement Conc. Driveway Entrance, per square yard	27 SY	\$ _____	\$ _____
R- 13 8-12	Chain Link Fence Type 4, per linear foot	40 LF	\$ _____	\$ _____

Contractor's Name: _____

Specification Number: PW21-0719F ADDENDUM 1

ITEM NO.	ITEM DESCRIPTION	ESTIMATE QUANTITY	UNIT PRICE	TOTAL AMOUNT
R- 14 8-13	Poured Monument, per each	3 EA	\$ _____	\$ _____
R- 15 8-14	Cement Conc. Sidewalk, per square yard	190 SY	\$ _____	\$ _____
R- 16 8-14	Cement Conc. Curb Ramp , per each	16 EA	\$ _____	\$ _____
R- 17 8-22	Plastic Line, per linear foot	800 LF	\$ _____	\$ _____
R- 18 8-22	Bike Lane Skip Line, per linear foot	90 LF	\$ _____	\$ _____
R- 19 8-22	Plastic Wide Lane Line, per linear foot	160 LF	\$ _____	\$ _____
R- 20 8-22	Plastic Stop Line, per linear foot	260 LF	\$ _____	\$ _____
R- 21 8-22	Plastic Crosswalk Line, per linear foot	1,600 LF	\$ _____	\$ _____
R- 22 8-22	Plastic Traffic Arrow, per each	1 EA	\$ _____	\$ _____
R- 23 8-22	Painted Curb, per linear foot	180 LF	\$ _____	\$ _____

SubTotal, Group R

Unit Bid Item Nos. R-1 through R-23

\$ _____ **(1)**

R-24 2-03	Field Adjustment	Force Account	<u>Estimated</u>	\$ 10,000.00	(2)
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R-25 8-02	Roadside Restoration	Force Account	<u>Estimated</u>	\$ 10,000.00	(3)
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Total, Group R **(1)+(2)+(3)** \$ _____ **(4)**

Contractor's Name: _____

Specification Number: PW21-0719F ADDENDUM 1

Group-L: South Yakima Signal and Safety Improvements
Lump Sum Bid Items L-1 through L-11
Specification No. PW21-0719F ADDENDUM 1

ITEM NO.	ITEM DESCRIPTION	ESTIMATE QUANTITY	UNIT PRICE	TOTAL AMOUNT
L- 1 1-07.15(1)	SPCC Plan, lump sum	1 LS	<u>LUMP SUM</u>	<u>\$</u>
L- 2 1-09.7	Mobilization, lump sum	1 LS	<u>LUMP SUM</u>	<u>\$</u>
L- 3 1-10	Project Temporary Traffic Control, lump sum	1 LS	<u>LUMP SUM</u>	<u>\$</u>
L- 4 2-01	Clearing and Grubbing, lump sum	1 LS	<u>LUMP SUM</u>	<u>\$</u>
L- 5 2-06	Subgrade Maintenance and Protection, lump sum	1 LS	<u>LUMP SUM</u>	<u>\$</u>
L- 6 8-01	Erosion Control and Water Pollution Prevention, lump sum	1 LS	<u>LUMP SUM</u>	<u>\$</u>
L- 7 8-01	Stormwater Pollution Prevention Plan (SWPPP), lump sum	1 LS	<u>LUMP SUM</u>	<u>\$</u>
L- 8 8-20	Traffic Signal Modification at S Yakima Avenue and S 72nd Street, Lump Sum	1 LS	<u>LUMP SUM</u>	<u>\$</u>
L- 9 8-20	Traffic Signal Modification at S Yakima Avenue and S 84th Street, Lump Sum	1 LS	<u>LUMP SUM</u>	<u>\$</u>
L- 10 8-20	Traffic Signal Modification at S Yakima Avenue and S 96th Street, Lump Sum	1 LS	<u>LUMP SUM</u>	<u>\$</u>
L- 11 8-21	Permanent Signing, lump sum	1 LS	<u>LUMP SUM</u>	<u>\$</u>

Total, Group L
Bid Item Nos. L-1 through L-11 **\$** (5)

Contractor's Name: _____

Specification Number: PW21-0719F ADDENDUM 1

BID TOTALS SUMMARY ADDENDUM 1:

GROUP R: Roadway Bid Items

GROUP R TOTAL \$ _____ **(4)**

GROUP L: Lump Sum Bid Items

GROUP L TOTAL \$ _____ **(5)**

TOTAL BASE BID (4) + (5) \$ _____ **(6)**

Proposal for Incorporating Recycled Materials into the Project

In compliance with a new law that went into effect January 1, 2016 (SHB1695), the Bidder shall propose below, the total percent of construction aggregate and concrete materials to be incorporated into the Project that are recycled materials. Calculated percentages must be within the amounts allowed in Section 9-03.21(1)E, Table on Maximum Allowable Percent (By Weight) of Recycled Material, of the Standard Specifications.

Proposed total percentage: _____ percent.

Note: Use of recycled materials is highly encouraged within the limits shown above, but does not constitute a Bidder Preference, and will not affect the determination of award, unless two or more lowest responsive Bid totals are exactly equal, in which case proposed recycling percentages will be used as a tie-breaker, per the APWA GSP in Section 1-02.6 of the Special Provisions.

Regardless, the Bidder's stated proposed percentages will become a goal the Contractor should do its best to accomplish. Bidders will be required to report on recycled materials actually incorporated into the Project, in accordance with the APWA GSP in Section 1-06.6 of the Special Provisions.

Contractor's Name: _____
Specification Number: **PW21-0719F ADDENDUM 1**
South Yakima Signal and Safety Improvements