Construction Plan Reading

Basics & Applications

July 12th, 2016 / 4 p.m.
Richland County Transportation Penny Office

Instructor
Ben W. Lewis, PE

Welcome & Introductions

Instructor

Ben W. Lewis, PE

- Project Manager for the Program Development Team (PDT)
- Professional Engineer employed by HDR | ICA
- 11 years of experience in highway design and plan development

Contact Information

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Phone: 803.726.3614

Training Outcomes

- Obtain familiarity with the layout of engineering construction plans with focus on roadway plans
- Obtain familiarity with the information provided within engineering construction plans
- Perform typical engineering calculations
- Perform typical construction quantity take-offs

- What other outcomes do you have in mind?

Training Outcomes

This training course is derived from applications specific to the South Carolina Department of Transportation (SCDOT). This course will reference practice and applications based on SCDOT standards and typical methods.

While all agencies have individual practices and methods for development of construction plans, the intent and information provided is very similar.

Course Outline

Part I

Plan Layout

- Up-Front Sheets
- Plan Design Sheets
- Cross-sections

Part II

Plan Reading Basics

- Stationing
- Horizontal Curves
- Vertical Curves

Part III

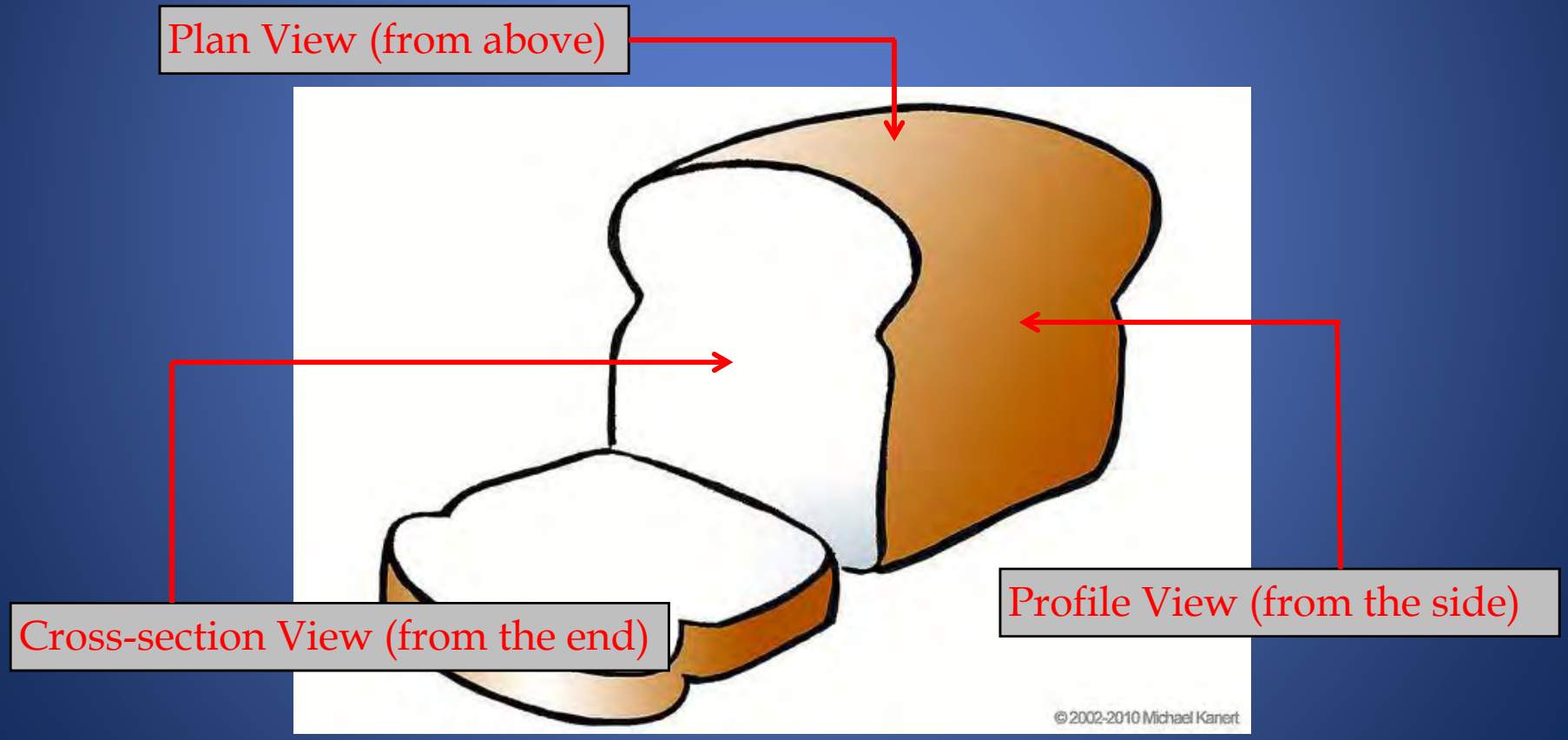
Plan Applications

- Typical Calculations / Quantity Take-off's

What is a Plan?

A plan is a living document that is the basic road map to construct a project. Contains plans, profiles and cross-sections (but not always).

A loaf of bread is a good example of the parts of a plan.



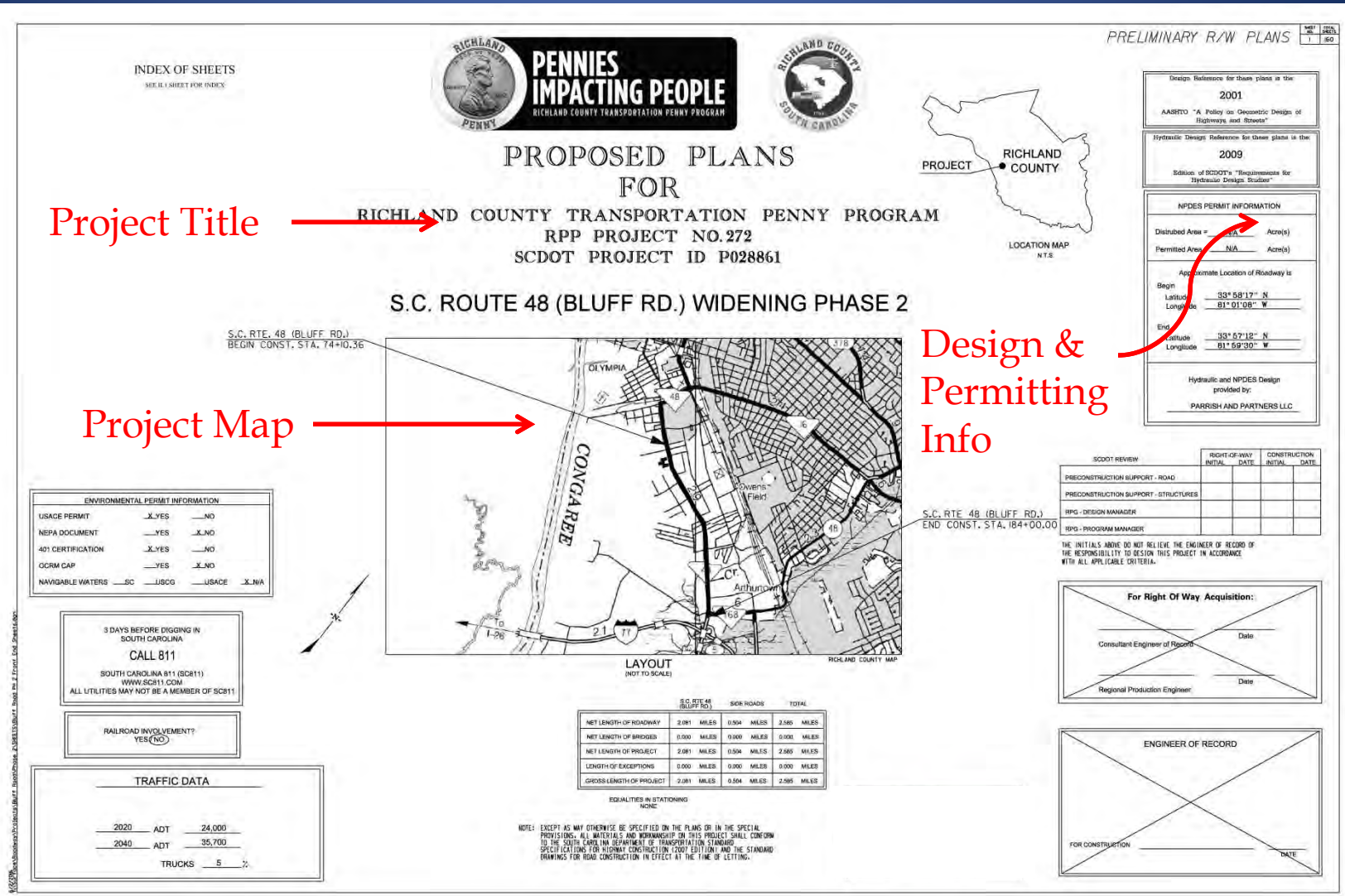
Part I

Plan Layout

- Up-Front Sheets
- Plan Design Sheets
- Cross-sections

Part I

Title Sheet



PRELIMINARY R/W PLANS

INDEX OF SHEETS

SEE ILI SHEET FOR INDEX

PENNIES IMPACTING PEOPLE
RICHLAND COUNTY TRANSPORTATION PENNY PROGRAM

PROPOSED PLANS
FOR
RICHLAND COUNTY TRANSPORTATION PENNY PROGRAM
RPP PROJECT NO. 272
SCDOT PROJECT ID P028861

S.C. ROUTE 48 (BLUFF RD.) WIDENING PHASE 2

PROJECT — RICHLAND COUNTY

LOCATION MAP
N.T.S.

Design Reference for these plans is the:
2001
AASHTO "A Policy on Geometric Design of Highways and Streets"

Hydraulic Design Reference for these plans is the:
2009
Edition of SCDOT's "Requirements for Hydraulic Design Studies"

NPDES PERMIT INFORMATION
Disturbed Area = N/A Acre(s)
Permitted Area = N/A Acre(s)
Approximate Location of Roadway is
Begin
Latitude 33° 58' 17" N
Longitude 81° 01' 08" W
End
Latitude 33° 57' 12" N
Longitude 81° 59' 30" W
Hydraulic and NPDES Design provided by:
PARRISH AND PARTNERS LLC

Project Title →

Project Map →

Design & Permitting Info →

S.C. RTE. 48 (BLUFF RD.)
BEGIN CONST. STA. 74+10.36

S.C. RTE 48 (BLUFF RD.)
END CONST. STA. 184+00.00

OLYMPIA
CONGAREE
Owens Field
Arthurtown
I-26
RICHLAND COUNTY MAP

LAYOUT
(NOT TO SCALE)

SCDOT REVIEW	RIGHT-OF-WAY INITIAL	RIGHT-OF-WAY DATE	CONSTRUCTION INITIAL	CONSTRUCTION DATE
PRECONSTRUCTION SUPPORT - ROAD				
PRECONSTRUCTION SUPPORT - STRUCTURES				
RPG - DESIGN MANAGER				
RPG - PROGRAM MANAGER				

THE INITIALS ABOVE DO NOT RELIEVE THE ENGINEER OF RECORD OF THE RESPONSIBILITY TO DESIGN THIS PROJECT IN ACCORDANCE WITH ALL APPLICABLE CRITERIA.

ENVIRONMENTAL PERMIT INFORMATION					
USACE PERMIT	X YES	NO			
NEPA DOCUMENT	YES	X NO			
401 CERTIFICATION	X YES	NO			
OCRM CAP	YES	X NO			
NAVIGABLE WATERS	SC	USCG	USACE	X N/A	

3 DAYS BEFORE DIGGING IN SOUTH CAROLINA
CALL 811
SOUTH CAROLINA 811 (SC811)
WWW.SC811.COM
ALL UTILITIES MAY NOT BE A MEMBER OF SC811

RAILROAD INVOLVEMENT?
YES (NO)

TRAFFIC DATA

2020 ADT 24,000
2040 ADT 35,700
TRUCKS 5 %

	S.C. RTE 48 (BLUFF RD.)		SIDE ROADS		TOTAL	
NET LENGTH OF ROADWAY	2.081	MILES	0.504	MILES	2.585	MILES
NET LENGTH OF BRIDGES	0.000	MILES	0.000	MILES	0.000	MILES
NET LENGTH OF PROJECT	2.081	MILES	0.504	MILES	2.585	MILES
LENGTH OF EXCEPTIONS	0.000	MILES	0.000	MILES	0.000	MILES
GROSS LENGTH OF PROJECT	2.081	MILES	0.504	MILES	2.585	MILES

EQUALITIES IN STATIONING
NONE

NOTE: EXCEPT AS MAY OTHERWISE BE SPECIFIED ON THE PLANS OR IN THE SPECIAL PROVISIONS, ALL MATERIALS AND WORKMANSHIP ON THIS PROJECT SHALL CONFORM TO THE SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION (2007 EDITION) AND THE STANDARD DRAWINGS FOR ROAD CONSTRUCTION IN EFFECT AT THE TIME OF LETTING.

For Right Of Way Acquisition:
Consultant Engineer of Record — Date
Regional Production Engineer — Date

ENGINEER OF RECORD
FOR CONSTRUCTION — DATE

Part I

Quantities Sheet

STATE	COUNTY	FILE NO.	ROADWAY NAME	SHT. NO.
S.C.	CHARLESTON	10.037468A	S.C. RTE. 7 / S.C. RTE. 61	2

SUMMARY OF ESTIMATED QUANTITIES

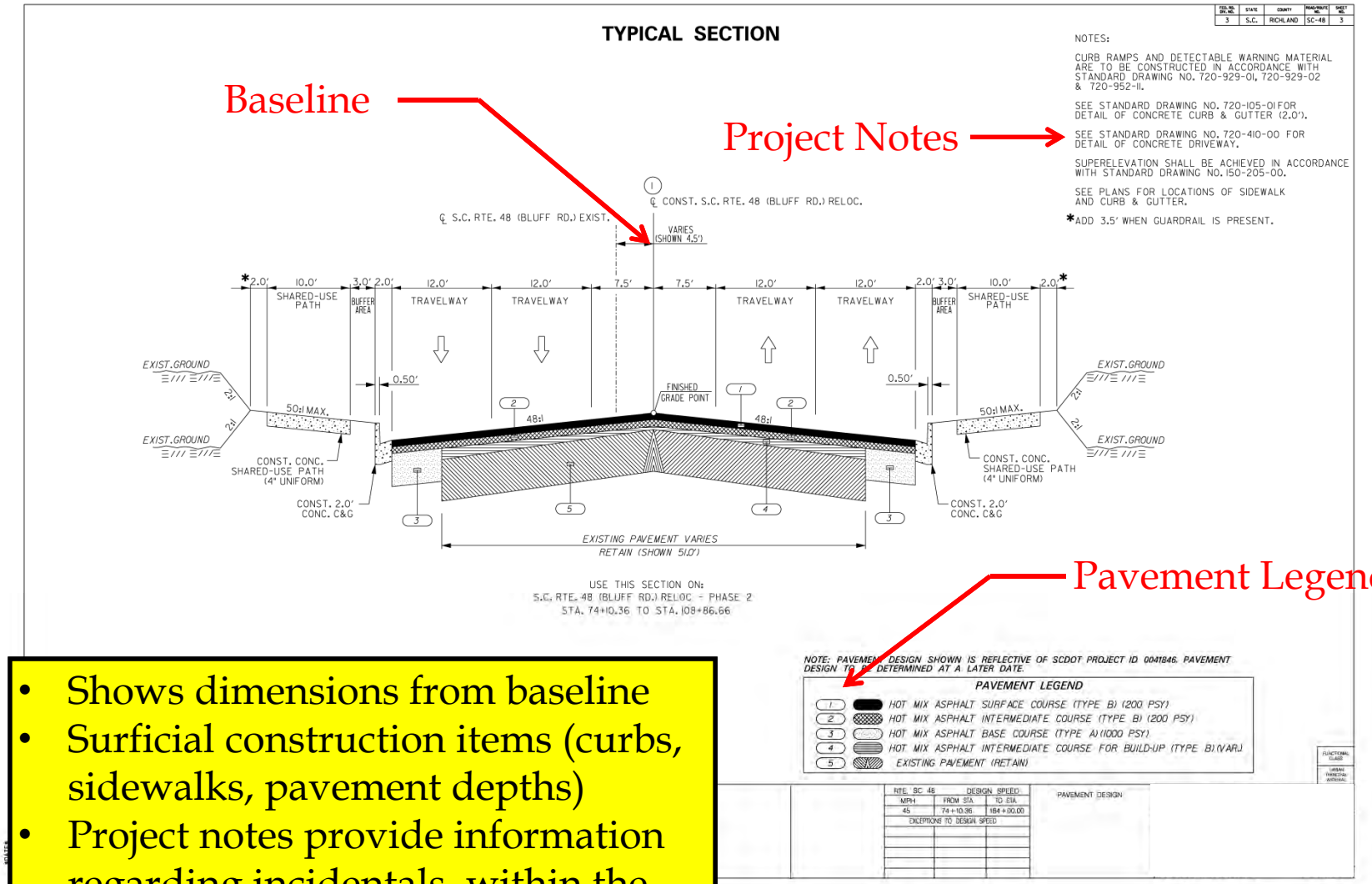
SECTION	ITEM	QUANTITY	UNIT
1031100	MOBILIZATION - SUBCONTRACTOR	NEC.	LS
1032010	BONDS AND INSURANCE	NEC.	LS
1071000	TRAFFIC CONTROL	NEC.	LS
2011000	CLEARING & GRUBBING WITHIN RIGHT OF WAY	NEC.	LS
2016000	SELECTED REMOVAL OF MARKED TREES	NEC.	LS
2016001	RELOCATE SELECTED TREES&SHRUBS	NEC.	LS
2021005	REMOVAL & DISPOSAL OF EXISTING CATCH BASIN	14.000	EA
2021010	REMOVAL & DISPOSAL OF EXISTING DROP INLET	9.000	EA
2021015	REMOVAL & DISPOSAL OF EXISTING MANHOLE	5.000	EA
2021020	REMOVAL & DISPOSAL OF EXISTING JUNCTION BOX	3.000	EA
2023000	REMOVAL & DISPOSAL OF EXISTING PAVEMENT	2560.000	SY
2024100	REMOVAL & DISPOSAL OF EXISTING CURB	5941.000	LF
2025000	REMOVAL & DISPOSAL OF EXISTING ASPHALT PAVEMENT	1040.000	SY
2031000	UNCLASSIFIED EXCAVATION	1477.000	CY
2081001	FINE GRADING	3405.000	SY
2103000	FLOWABLE FILL	100.000	CY
3069900	MAINTENANCE STONE	350.000	TON
3100310	HOT MIX ASPHALT BASE COURSE - TYPE A	1199.000	TON
4011004	LIQUID ASPHALT BINDER PG64-22	57.000	TON
4011060	LIQUID ASPHALT BINDER PG76-22	373.000	TON
4012080	FULL DEPTH ASPH. PAV. PATCHING 8" UNIF	25.000	SY
4013980	MILLING EXISTING ASPHALT PAVEMENT (VARIABLE)	24426.000	SY
4020310	HOT MIX ASPHALT INTERMEDIATE COURSE TYPE A	1872.000	TON
4030210	HOT MIX ASPHALT SURFACE COURSE TYPE A	5566.000	TON
4039903	ASPHALT PAVEMENT TEXTURING - OFFSET BRICK(BRICK)	262.000	SY
6051120	PERMANENT CONSTRUCTION SIGNS (GROUND MOUNTED)	736.000	SF
6092100	TEMPORARY CLEAR PAVEMENT MARKERS MONO-DIR.-4"X4"	205.000	EA
6092155	TEMPORARY YELLOW PAVEMENT MARKERS BI-DIR.-4"X4"	130.000	EA
6250005	4" WHITE BROKEN LINES -(GAPS EXCLUDED)-FAST DRY PAINT	4834.000	LF
6250010	4" WHITE SOLID LINES (PVT. EDGE LINES)-FAST DRY PAINT	600.000	LF
6250015	8"WHITE SOLID LINES(CROSSWALK&CHANNELIZATION)FAST DRY PAINT	1688.000	LF
6250025	24" WHITE SOLID LINES (STOP/DIAGONAL LINES)-FAST DRY PAINT	757.000	LF
6250030	WHITE SINGLE ARROW (LEFT, STRAIGHT, RIGHT)-FAST DRY PAINT	25.000	EA
6250035	WHITE WORD MESSAGE "ONLY"-FAST DRY PAINT	18.000	EA
6250105	4" YELLOW BROKEN LINES(GAPS EXC) - FAST DRY PAINT	1270.000	LF
6250110	4"YELLOW SOLID LINE(PVT.EDGE&NO PASSING ZONE)-FAST DRY PAINT	12680.000	LF

SECTION	ITEM		UNIT
6531210	U-SECTION POST FOR SIGN SUPPORTS - 3P	857.000	LF
6531215	U-SECTION POST FOR SIGN BRACING - 2P	117.330	LF
6562107	FLEXIBLE DELINEATOR POST, 4"X12", TYPE 4 SHEETING REFLECTOR	9.000	EA
6750275	FURNISH & INSTALL 1.0" SCHEDULE 80 PVC CONDUIT	270.000	LF
6750278	FURNISH & INSTALL 2.0" SCHEDULE 80 PVC CONDUIT	1700.000	LF
675027C	FURNISH & INSTALL 3.0" SCHEDULE 80 PVC CONDUIT	80.000	LF
675027S	FURNISH & INSTALL 2.0" SCHD 80 PVC CONDUIT (DIRECTION.BORED)	480.000	LF
675027Z	FURNISH ADDITIONAL CONDUIT WITHIN DIRECTIONAL BORE	670.000	LF
6770388	FURNISH & INSTALL NO. 14 COPPER WIRE, 4 CONDUCTOR - BLACK	2070.000	LF
6770389	FURNISH & INSTALL NO. 14 COPPER WIRE, 4 CONDUCTOR - GRAY	3480.000	LF
6770393	FURNISH & INSTALL NO. 14 COPPER WIRE, 8 CONDUCTOR (BLACK)	2100.000	LF
6770394	FURNISH & INSTALL NO. 14 COPPER WIRE, 8 CONDUCTOR (GRAY)	890.000	LF
6770413	FURNISH & INSTL NO. 14 COPPER WIRE,1-CONDUCTOR FOR LOOP WIRE	6880.000	LF
6780495	SAWCUT FOR LOOP DETECTOR	3490.000	LF
6800500	MOD. EXIST ELECTRICAL SERVICE FOR TRAFFIC SIGNAL	2.000	EA
6800518	F&I-13"X24"X18"D.ELEC.FLUSH UNDGRD.ENCLOS-(STR,POLY.CONC.)HD	21.000	EA
6826484	FURNISH & INSTALL 10' BREAK-AWAY ALUM PEDESTAL POLE AND BASE	2.000	EA
6845511	F&I - CONTR 332/336 CABINET ASSEMBLY - BASE MOUNTED	2.000	EA
6865710	F&I - 12" 1-WAY-5 SEC(R,Y,YA,G,GA)VEHICLE TRAFFIC SI	3.000	EA
6865720	F&I -12" 1-WAY-4 SECTION(RA+RA/YA,GA)VEHICHLE TRAFFIC SIG	3.000	EA
6865723	F&I - 12" 1-WAY-3 SECTION(RA,YA,YAF)VEH TRAFFIC SIGNAL	18.000	EA
6865781	F&I - 1-WAY-1SECT.HAND/MAN EMBLEM PEDESTRIAN SIGNAL HEAD	12.000	EA
6865794	F&I-PED PUSH BUTTON MICRO ASSEMBLY(9"X15")AND SIGN(R-10-3E or R10-4a)	12.000	EA
6865834	BACKPLATE W/ RETROREFL.BORDERS FOR TRAFF. SIG.	24.000	EA
6885990	REMOVAL,SALVAGE,&DISP.OF EXISTING TRAF. SIGNAL EQUIPMENT	NEC.	LS
6885992	TEMPORARY ADJUSTMENT OF TRAFFIC SIGNAL EQUIPMENT	NEC.	LS
6885996	TEMPORARY TIMING ADJUSTMENTS PER SITE VISIT	1.000	EA
6886010	INTEGRATION	NEC.	LS
6887951	FURNISH & INSTALL CONCRETE CABINET FOUNDATION	2.000	EA
6888177	DESIGN, FURNISH & INSTALL STEEL POLE WITH TWIN MAST ARMS INCLUDING FOUNDATION	2.000	EA
6888179	DESIGN, FURNISH & INSTALL STEEL POLE WITH MAST ARM INCLUDING FOUNDATION	4.000	EA
7011403	CONC. FOR STRUCTURES - CLASS 4000(ROADWAY)	2.400	CY
7141111	12" RC PIPE CUL.-CLASS III	16.000	LF
7141112	15" RC PIPE CUL.-CLASS III	420.000	LF
7141113	18" RC PIPE CUL.-CLASS III	1784.000	LF
7141114	24" RC PIPE CUL.-CLASS III	1492.000	LF
7141116	36" RC PIPE CUL.-CLASS III	240.000	LF
7141117	42" RC PIPE CUL.-CLASS III	76.000	LF
7149972	LINE EXISTING 15" PIPE	158.000	LF
7149973	LINE EXISTING 18" PIPE		LF

2011000	CLEARING & GRUBBING WITHIN RIGHT OF WAY	NEC.	LS
2016000	SELECTED REMOVAL OF MARKED TREES	NEC.	LS
2016001	RELOCATE SELECTED TREES&SHRUBS	NEC.	LS
2021005	REMOVAL & DISPOSAL OF EXISTING CATCH BASIN	14.000	EA
2021010	REMOVAL & DISPOSAL OF EXISTING DROP INLET	9.000	EA
2021015	REMOVAL & DISPOSAL OF EXISTING MANHOLE	5.000	EA
2021020	REMOVAL & DISPOSAL OF EXISTING JUNCTION BOX	3.000	EA
2023000	REMOVAL & DISPOSAL OF EXISTING PAVEMENT	2550.000	SY
2024100	REMOVAL & DISPOSAL OF EXISTING CURB	5941.000	LF
2025000	REMOVAL & DISPOSAL OF EXISTING ASPHALT PAVEMENT	1040.000	SY

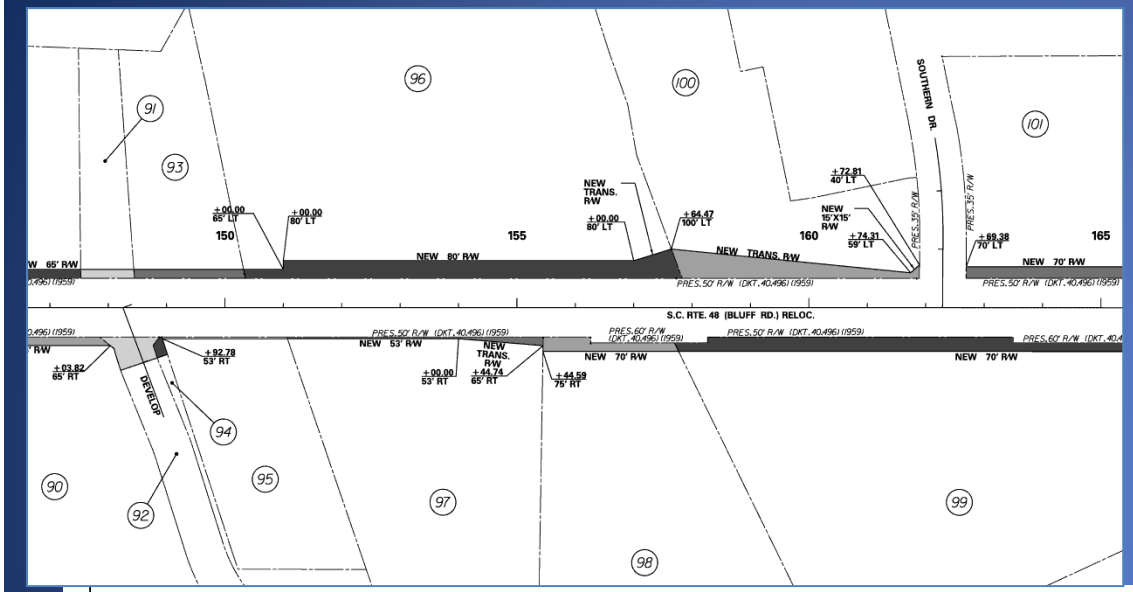
Part I

Typical Section Sheet



- Shows dimensions from baseline
- Surficial construction items (curbs, sidewalks, pavement depths)
- Project notes provide information regarding incidentals within the area of typical section

Part I Property / Right-of-Way Data Sheets

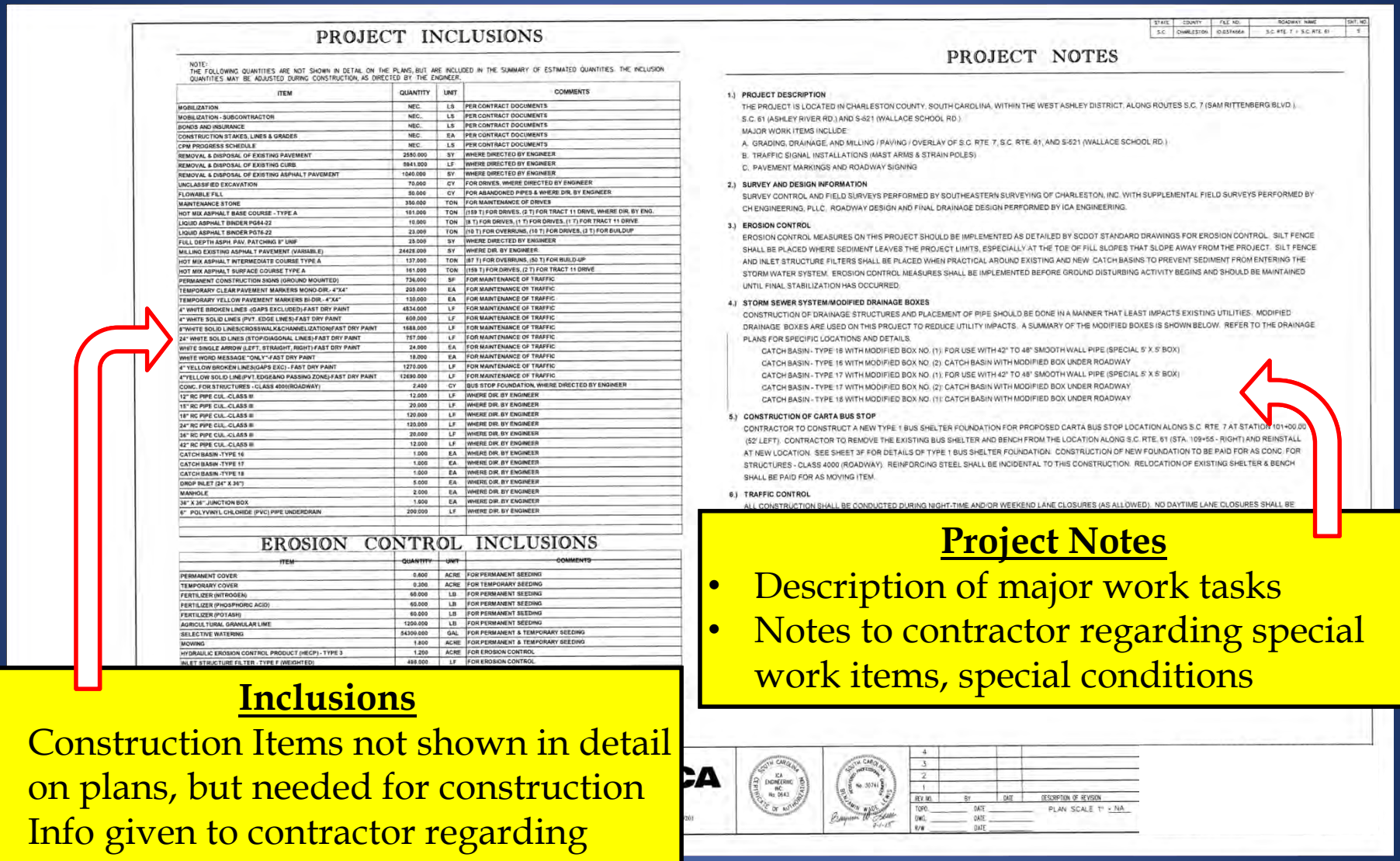


- Graphically represents existing & new rights-of-way
- Shows impacts per parcel
- Provides right-of-way totals and any permissions needed

TRACT NO.	PROPERTY OWNER	TAX MAP REFERENCE	TOTAL TRACT ACRES	OBTAIN				REMAINDER LEFT ACRES [A]	REMAINDER RIGHT ACRES [A]	DATE ACQUIRED	TYPE OF INSTRUMENT	PERMISSION (YES)					
				OUTFALL DITCH	LEFT	RIGHT	TOTAL					OUTFALL DITCH	SLOPE	DRAINAGE STRUCTURE	EROSION CONTROL	ENTRANCE CONSTRUCTION	
20	1231 BLUFF ROAD LLC	R11209-04-05	4.48			6872 SF *0.158 Ac*	6872 SF *0.158 Ac*		4.322								
21	3 MAN AUTO SERVICE INC	R11209-01-07			374 SF *0.009 Ac*		374 SF *0.009 Ac*	-0.009									
22	BURKWOOD CONSTRUCTION INC	R11209-01-06	0.71		644 SF *0.015 Ac*		644 SF *0.015 Ac*	0.697									
23	BLAKE BETTY L TRUSTEE ETAL	R11209-03-07	1.82		2320 SF *0.053 Ac*		2320 SF *0.053 Ac*	1.767									
24	S C ELECTRIC & GAS CO	R11209-04-07	0.22			694 SF *0.016 Ac*	694 SF *0.016 Ac*		0.200								
25	FTC PROPERTIES LLC	R11209-04-08	1.60			1622 SF *0.037 Ac*	1622 SF *0.037 Ac*		1.563								
26	B & D PROPERTIES A SC PRTSHP	R11209-03-06	4.21		1134 SF *0.026 Ac*		1134 SF *0.026 Ac*	4.184									
27	WALE COMMERCIAL PROPERTY LLC	R11112-01-02	0.48			650 SF *0.015 Ac*	650 SF *0.015 Ac*		0.465								
28	WALE COMMERCIAL PROPERTY LLC	R11112-01-44	0.26			350 SF *0.008 Ac*	350 SF *0.008 Ac*		0.252								
29	BLUFF RD LLC	R11209-03-05	2.53		750 SF *0.017 Ac*		750 SF *0.017 Ac*	2.513									

Part I

Construction Notes Sheets



PROJECT INCLUSIONS

NOTE:
THE FOLLOWING QUANTITIES ARE NOT SHOWN IN DETAIL ON THE PLANS, BUT ARE INCLUDED IN THE SUMMARY OF ESTIMATED QUANTITIES. THE INCLUSION QUANTITIES MAY BE ADJUSTED DURING CONSTRUCTION, AS DIRECTED BY THE ENGINEER.

ITEM	QUANTITY	UNIT	COMMENTS
MOBILIZATION	NEC.	LS	PER CONTRACT DOCUMENTS
MOBILIZATION - SUBCONTRACTOR	NEC.	LS	PER CONTRACT DOCUMENTS
BONDS AND INSURANCE	NEC.	LS	PER CONTRACT DOCUMENTS
CONSTRUCTION STAKES, LINES & GRADES	NEC.	EA	PER CONTRACT DOCUMENTS
CPM PROGRESS SCHEDULE	NEC.	LS	PER CONTRACT DOCUMENTS
REMOVAL & DISPOSAL OF EXISTING PAVEMENT	2550.000	SY	WHERE DIRECTED BY ENGINEER
REMOVAL & DISPOSAL OF EXISTING CURB	5941.000	LF	WHERE DIRECTED BY ENGINEER
REMOVAL & DISPOSAL OF EXISTING ASPHALT PAVEMENT	1040.000	SY	WHERE DIRECTED BY ENGINEER
UNCLASSIFIED EXCAVATION	70.000	CY	FOR DRIVES, WHERE DIRECTED BY ENGINEER
FLOWABLE FILL	50.000	CY	FOR ABANDONED PIPES & WHERE DIR. BY ENGINEER
MAINTENANCE STONE	350.000	TON	FOR MAINTENANCE OF DRIVES
HOT MIX ASPHALT BASE COURSE - TYPE A	101.000	TON	(159 T.) FOR DRIVES, (2 T.) FOR TRACT 11 DRIVE, WHERE DIR. BY ENG.
LIQUID ASPHALT BINDER PG64-22	10.000	TON	(8 T.) FOR DRIVES, (1 T.) FOR DRIVES, (1 T.) FOR TRACT 11 DRIVE
LIQUID ASPHALT BINDER PG76-22	23.000	TON	(10 T.) FOR OVERRUNS, (10 T.) FOR DRIVES, (3 T.) FOR BUILDUP
FULL DEPTH ASPH. PAV. PATCHING 9" UNIF	25.000	SY	WHERE DIRECTED BY ENGINEER
MILLING EXISTING ASPHALT PAVEMENT (VARIABLE)	24425.000	SY	WHERE DIR. BY ENGINEER
HOT MIX ASPHALT INTERMEDIATE COURSE TYPE A	137.000	TON	(87 T.) FOR OVERRUNS, (50 T.) FOR BUILD-UP
HOT MIX ASPHALT SURFACE COURSE TYPE A	161.000	TON	(159 T.) FOR DRIVES, (2 T.) FOR TRACT 11 DRIVE
PERMANENT CONSTRUCTION SIGNS (GROUND MOUNTED)	736.000	SF	FOR MAINTENANCE OF TRAFFIC
TEMPORARY CLEAR PAVEMENT MARKERS MONO-DIR.- 4"X4"	293.000	EA	FOR MAINTENANCE OF TRAFFIC
TEMPORARY YELLOW PAVEMENT MARKERS BI-DIR.- 4"X4"	130.000	EA	FOR MAINTENANCE OF TRAFFIC
4" WHITE BROKEN LINES -(GAPS EXCLUDED)-FAST DRY PAINT	4834.000	LF	FOR MAINTENANCE OF TRAFFIC
4" WHITE SOLID LINES (PVT. EDGE LINES)-FAST DRY PAINT	609.000	LF	FOR MAINTENANCE OF TRAFFIC
8"WHITE SOLID LINES(CROSSWALK,X,CHANNELIZATION)FAST DRY PAINT	1688.000	LF	FOR MAINTENANCE OF TRAFFIC
24" WHITE SOLID LINES (STOP/DIAGONAL LINES)-FAST DRY PAINT	757.000	LF	FOR MAINTENANCE OF TRAFFIC
WHITE SINGLE ARROW (LEFT, STRAIGHT, RIGHT)-FAST DRY PAINT	24.000	EA	FOR MAINTENANCE OF TRAFFIC
WHITE WORD MESSAGE "ONLY"-FAST DRY PAINT	18.000	EA	FOR MAINTENANCE OF TRAFFIC
4" YELLOW BROKEN LINES(GAPS EXC) - FAST DRY PAINT	1270.000	LF	FOR MAINTENANCE OF TRAFFIC
4"YELLOW SOLID LINE(PVT.EDGE&NO PASSING ZONE)-FAST DRY PAINT	12690.000	LF	FOR MAINTENANCE OF TRAFFIC
CONC. FOR STRUCTURES - CLASS 4000(ROADWAY)	2.400	CY	BUS STOP FOUNDATION, WHERE DIRECTED BY ENGINEER
12" RC PIPE CUL.-CLASS III	12.000	LF	WHERE DIR. BY ENGINEER
15" RC PIPE CUL.-CLASS III	20.000	LF	WHERE DIR. BY ENGINEER
18" RC PIPE CUL.-CLASS III	120.000	LF	WHERE DIR. BY ENGINEER
24" RC PIPE CUL.-CLASS III	120.000	LF	WHERE DIR. BY ENGINEER
36" RC PIPE CUL.-CLASS III	20.000	LF	WHERE DIR. BY ENGINEER
42" RC PIPE CUL.-CLASS III	12.000	LF	WHERE DIR. BY ENGINEER
CATCH BASIN -TYPE 16	1.000	EA	WHERE DIR. BY ENGINEER
CATCH BASIN -TYPE 17	1.000	EA	WHERE DIR. BY ENGINEER
CATCH BASIN -TYPE 18	1.000	EA	WHERE DIR. BY ENGINEER
DROP INLET (24" X 36")	5.000	EA	WHERE DIR. BY ENGINEER
MANHOLE	2.000	EA	WHERE DIR. BY ENGINEER
36" X 36" JUNCTION BOX	1.000	EA	WHERE DIR. BY ENGINEER
6" POLYVINYL CHLORIDE (PVC) PIPE UNDERDRAIN	200.000	LF	WHERE DIR. BY ENGINEER

EROSION CONTROL INCLUSIONS

ITEM	QUANTITY	UNIT	COMMENTS
PERMANENT COVER	0.600	ACRE	FOR PERMANENT SEEDING
TEMPORARY COVER	0.300	ACRE	FOR TEMPORARY SEEDING
FERTILIZER (NITROGEN)	60.000	LB	FOR PERMANENT SEEDING
FERTILIZER (PHOSPHORIC ACID)	60.000	LB	FOR PERMANENT SEEDING
FERTILIZER (POTASH)	60.000	LB	FOR PERMANENT SEEDING
AGRICULTURAL GRANULAR LIME	1200.000	LB	FOR PERMANENT SEEDING
SELECTIVE WATERING	84300.000	GAL	FOR PERMANENT & TEMPORARY SEEDING
MOWING	1.800	ACRE	FOR PERMANENT & TEMPORARY SEEDING
HYDRAULIC EROSION CONTROL PRODUCT (HECP) - TYPE 3	1.200	ACRE	FOR EROSION CONTROL
INLET STRUCTURE FILTER - TYPE F (WEIGHTED)	468.000	LF	FOR EROSION CONTROL

PROJECT NOTES

STATE	COUNTY	FILE NO.	ROADWAY NAME	SHT. NO.
S.C.	CHARLESTON	10.057406A	S.C. RTE. 7 + S.C. RTE. 61	1

1.) **PROJECT DESCRIPTION**
THE PROJECT IS LOCATED IN CHARLESTON COUNTY, SOUTH CAROLINA, WITHIN THE WEST ASHLEY DISTRICT, ALONG ROUTES S.C. 7 (SAM RITTENBERG BLVD.), S.C. 61 (ASHLEY RIVER RD.) AND S-521 (WALLACE SCHOOL RD.).
MAJOR WORK ITEMS INCLUDE:
A. GRADING, DRAINAGE, AND MILLING / PAVING / OVERLAY OF S.C. RTE. 7, S.C. RTE. 61, AND S-521 (WALLACE SCHOOL RD.)
B. TRAFFIC SIGNAL INSTALLATIONS (MAST ARMS & STRAIN POLES)
C. PAVEMENT MARKINGS AND ROADWAY SIGNING

2.) **SURVEY AND DESIGN INFORMATION**
SURVEY CONTROL AND FIELD SURVEYS PERFORMED BY SOUTHEASTERN SURVEYING OF CHARLESTON, INC. WITH SUPPLEMENTAL FIELD SURVEYS PERFORMED BY CH ENGINEERING, PLLC. ROADWAY DESIGN AND FINAL DRAINAGE DESIGN PERFORMED BY IGA ENGINEERING.

3.) **EROSION CONTROL**
EROSION CONTROL MEASURES ON THIS PROJECT SHOULD BE IMPLEMENTED AS DETAILED BY SCDOT STANDARD DRAWINGS FOR EROSION CONTROL. SILT FENCE SHALL BE PLACED WHERE SEDIMENT LEAVES THE PROJECT LIMITS, ESPECIALLY AT THE TOE OF FILL SLOPES THAT SLOPE AWAY FROM THE PROJECT. SILT FENCE AND INLET STRUCTURE FILTERS SHALL BE PLACED WHEN PRACTICAL AROUND EXISTING AND NEW CATCH BASINS TO PREVENT SEDIMENT FROM ENTERING THE STORM WATER SYSTEM. EROSION CONTROL MEASURES SHALL BE IMPLEMENTED BEFORE GROUND DISTURBING ACTIVITY BEGINS AND SHOULD BE MAINTAINED UNTIL FINAL STABILIZATION HAS OCCURRED.

4.) **STORM SEWER SYSTEM/MODIFIED DRAINAGE BOXES**
CONSTRUCTION OF DRAINAGE STRUCTURES AND PLACEMENT OF PIPE SHOULD BE DONE IN A MANNER THAT LEAST IMPACTS EXISTING UTILITIES. MODIFIED DRAINAGE BOXES ARE USED ON THIS PROJECT TO REDUCE UTILITY IMPACTS. A SUMMARY OF THE MODIFIED BOXES IS SHOWN BELOW. REFER TO THE DRAINAGE PLANS FOR SPECIFIC LOCATIONS AND DETAILS.
CATCH BASIN - TYPE 16 WITH MODIFIED BOX NO. (1): FOR USE WITH 42" TO 48" SMOOTH WALL PIPE (SPECIAL 5' X 5' BOX)
CATCH BASIN - TYPE 16 WITH MODIFIED BOX NO. (2): CATCH BASIN WITH MODIFIED BOX UNDER ROADWAY
CATCH BASIN - TYPE 17 WITH MODIFIED BOX NO. (1): FOR USE WITH 42" TO 48" SMOOTH WALL PIPE (SPECIAL 5' X 5' BOX)
CATCH BASIN - TYPE 17 WITH MODIFIED BOX NO. (2): CATCH BASIN WITH MODIFIED BOX UNDER ROADWAY
CATCH BASIN - TYPE 18 WITH MODIFIED BOX NO. (1): CATCH BASIN WITH MODIFIED BOX UNDER ROADWAY

5.) **CONSTRUCTION OF CARTA BUS STOP**
CONTRACTOR TO CONSTRUCT A NEW TYPE 1 BUS SHELTER FOUNDATION FOR PROPOSED CARTA BUS STOP LOCATION ALONG S.C. RTE. 7 AT STATION 101+00.00 (52' LEFT). CONTRACTOR TO REMOVE THE EXISTING BUS SHELTER AND BENCH FROM THE LOCATION ALONG S.C. RTE. 61 (STA. 109+55 - RIGHT) AND REINSTALL AT NEW LOCATION. SEE SHEET 3F FOR DETAILS OF TYPE 1 BUS SHELTER FOUNDATION. CONSTRUCTION OF NEW FOUNDATION TO BE PAID FOR AS CONC. FOR STRUCTURES - CLASS 4000 (ROADWAY). REINFORCING STEEL SHALL BE INCIDENTAL TO THIS CONSTRUCTION. RELOCATION OF EXISTING SHELTER & BENCH SHALL BE PAID FOR AS MOVING ITEM.

6.) **TRAFFIC CONTROL**
ALL CONSTRUCTION SHALL BE CONDUCTED DURING NIGHT-TIME AND/OR WEEKEND LANE CLOSURES (AS ALLOWED). NO DAYTIME LANE CLOSURES SHALL BE

REV NO.	BY	DATE	DESCRIPTION OF REVISION
4			
3			
2			
1			

TOPO. _____ DATE _____ PLAN SCALE 1" = NA
DWG. _____ DATE _____
R/W _____ DATE _____

Inclusions

- Construction Items not shown in detail on plans, but needed for construction
- Info given to contractor regarding specific use of certain items

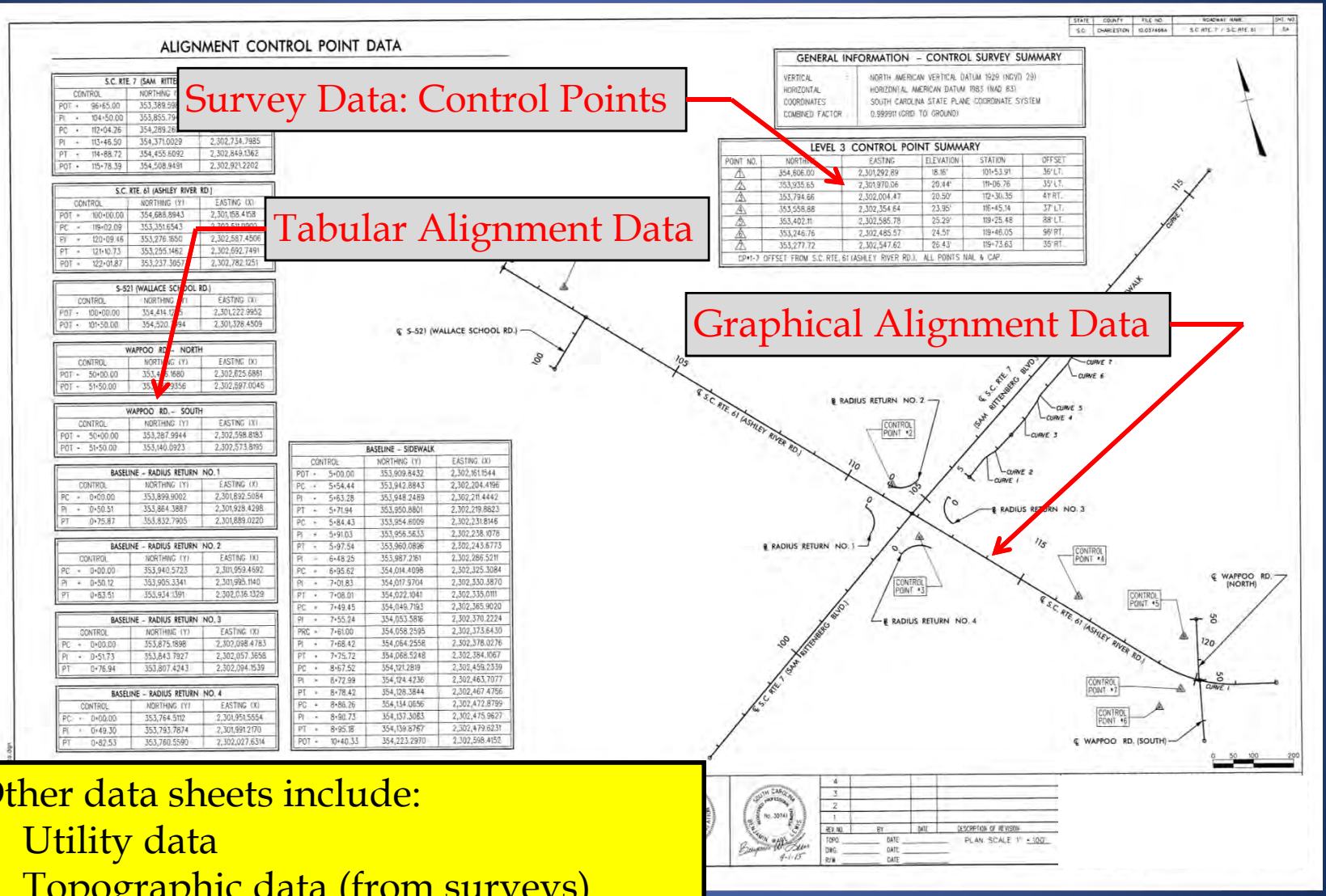
Project Notes

- Description of major work tasks
- Notes to contractor regarding special work items, special conditions

Part I

Project Data Sheets

Example: Alignment Data

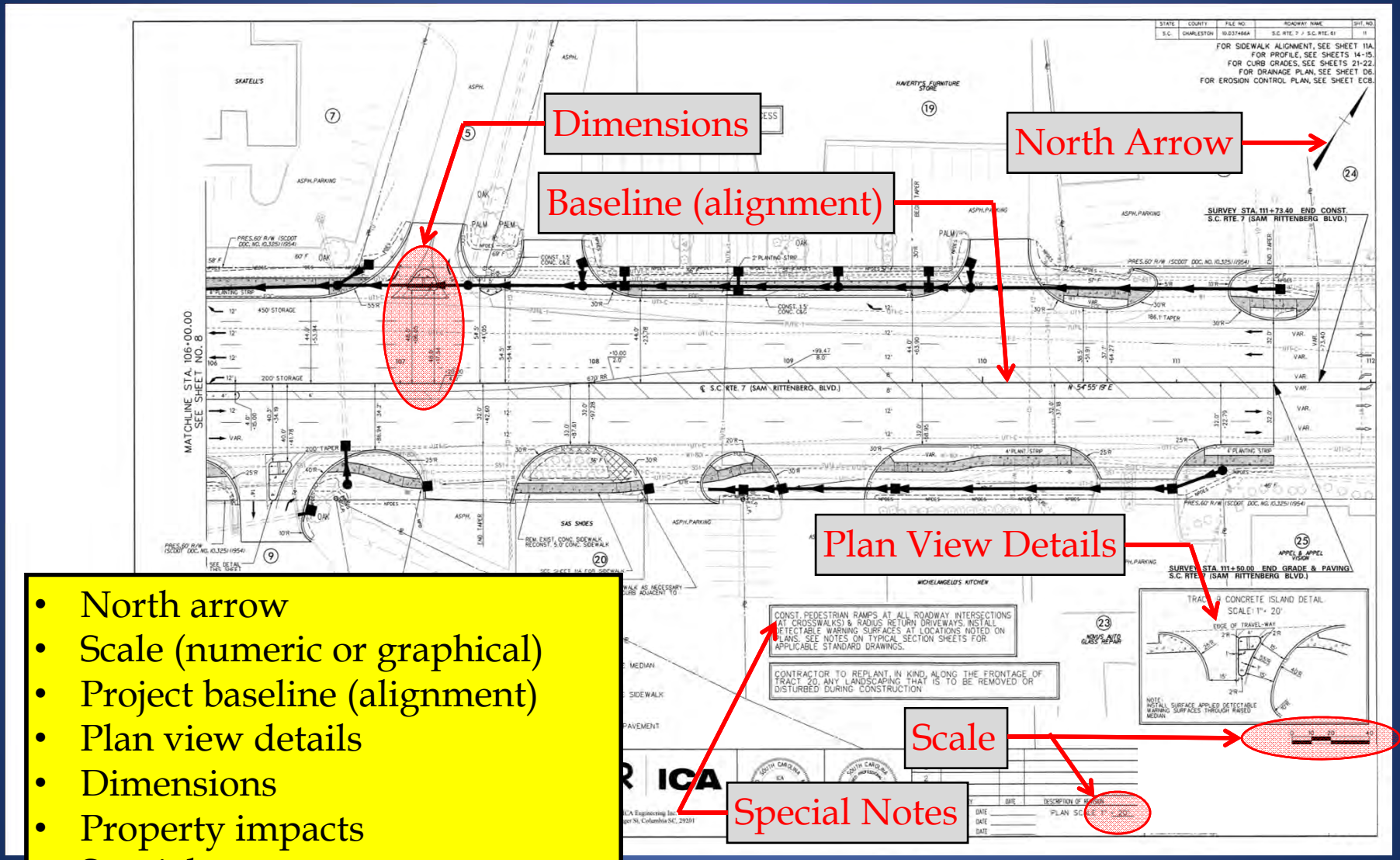


Other data sheets include:

- Utility data
- Topographic data (from surveys)

Part I

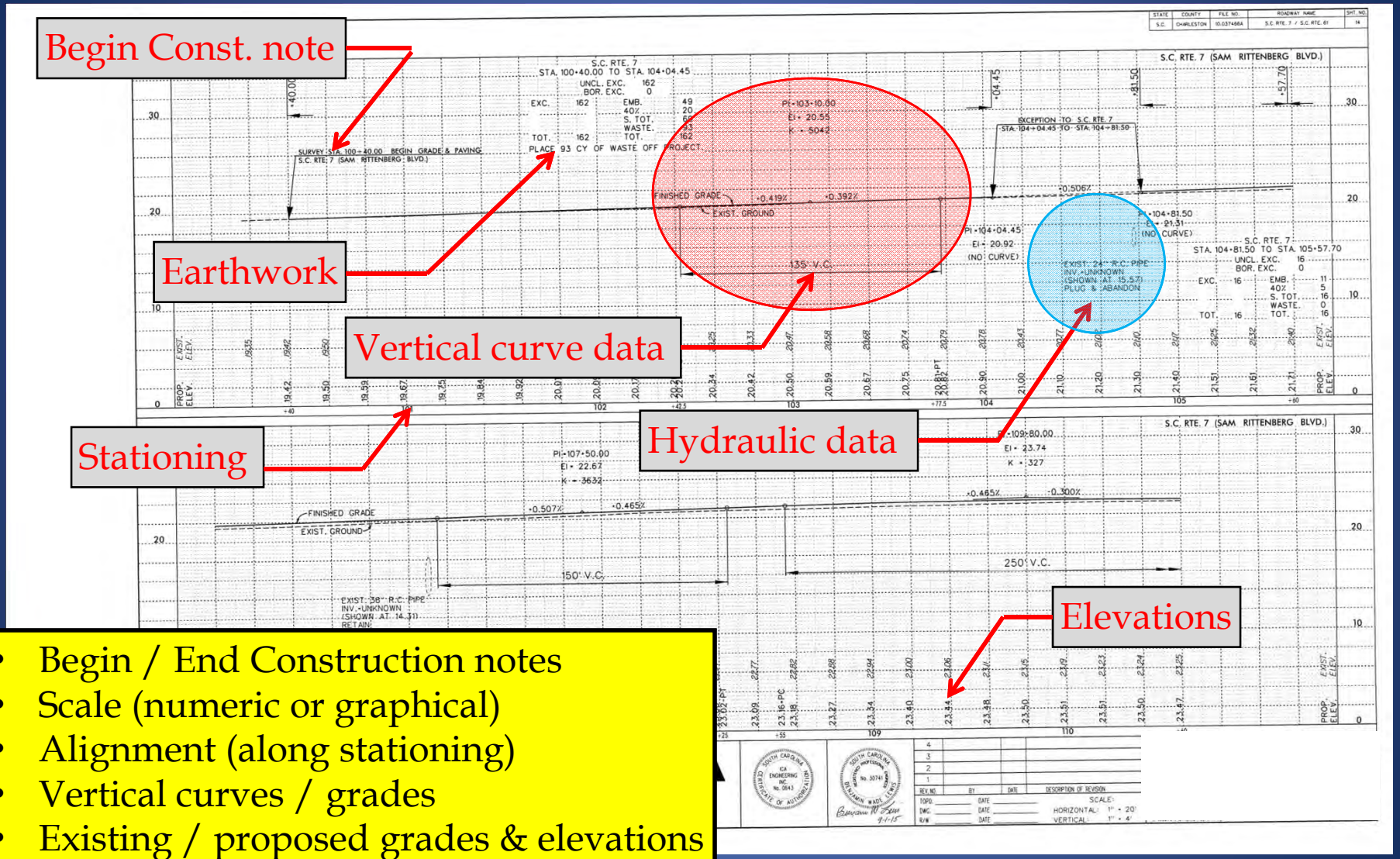
Plan Sheets



- North arrow
- Scale (numeric or graphical)
- Project baseline (alignment)
- Plan view details
- Dimensions
- Property impacts
- Special notes
- Existing & proposed conditions

Part I

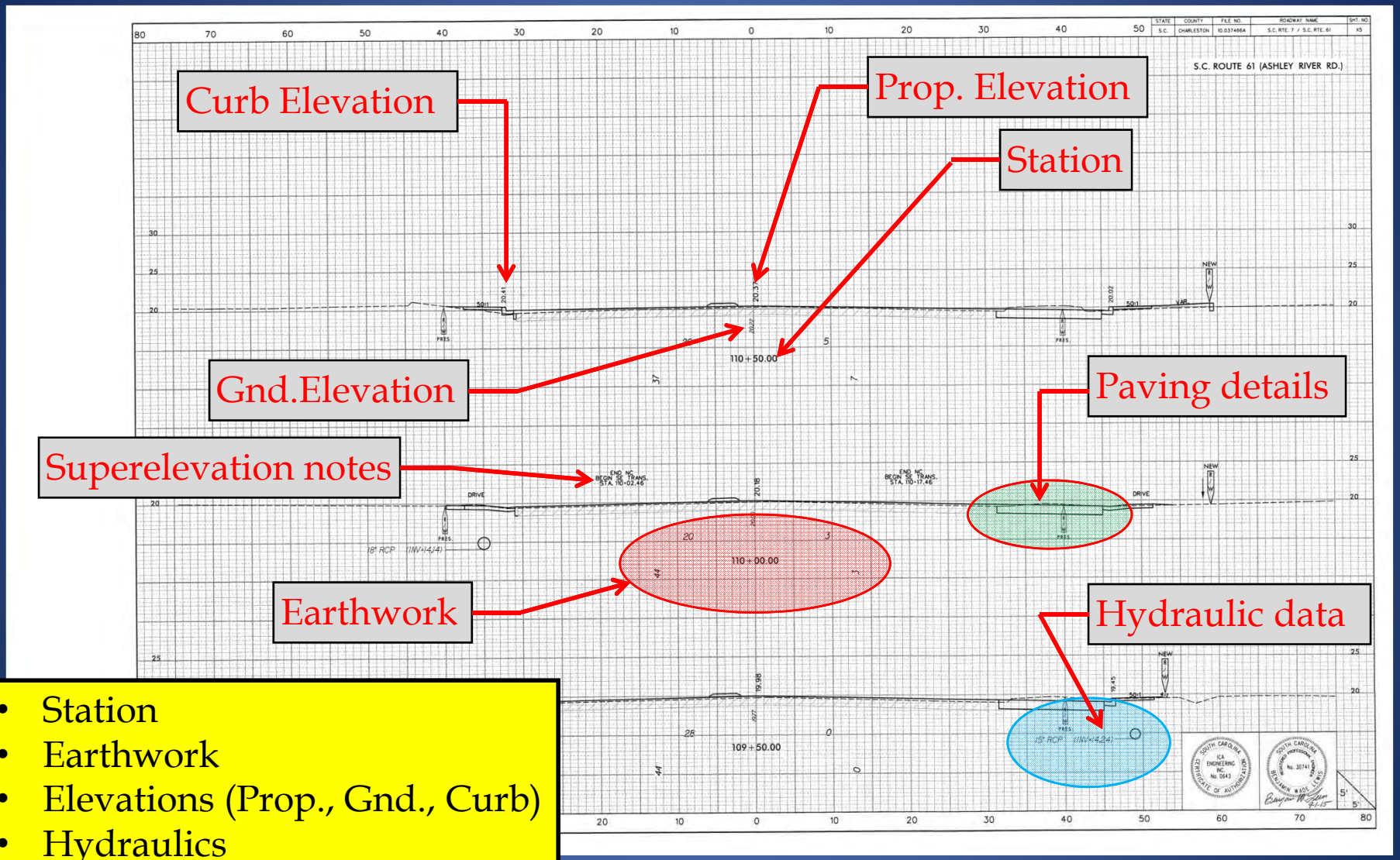
Profile Sheets



- Begin / End Construction notes
- Scale (numeric or graphical)
- Alignment (along stationing)
- Vertical curves / grades
- Existing / proposed grades & elevations
- Hydraulic data (crossline pipes)
- Earthwork data

Part I

Cross-section Sheets



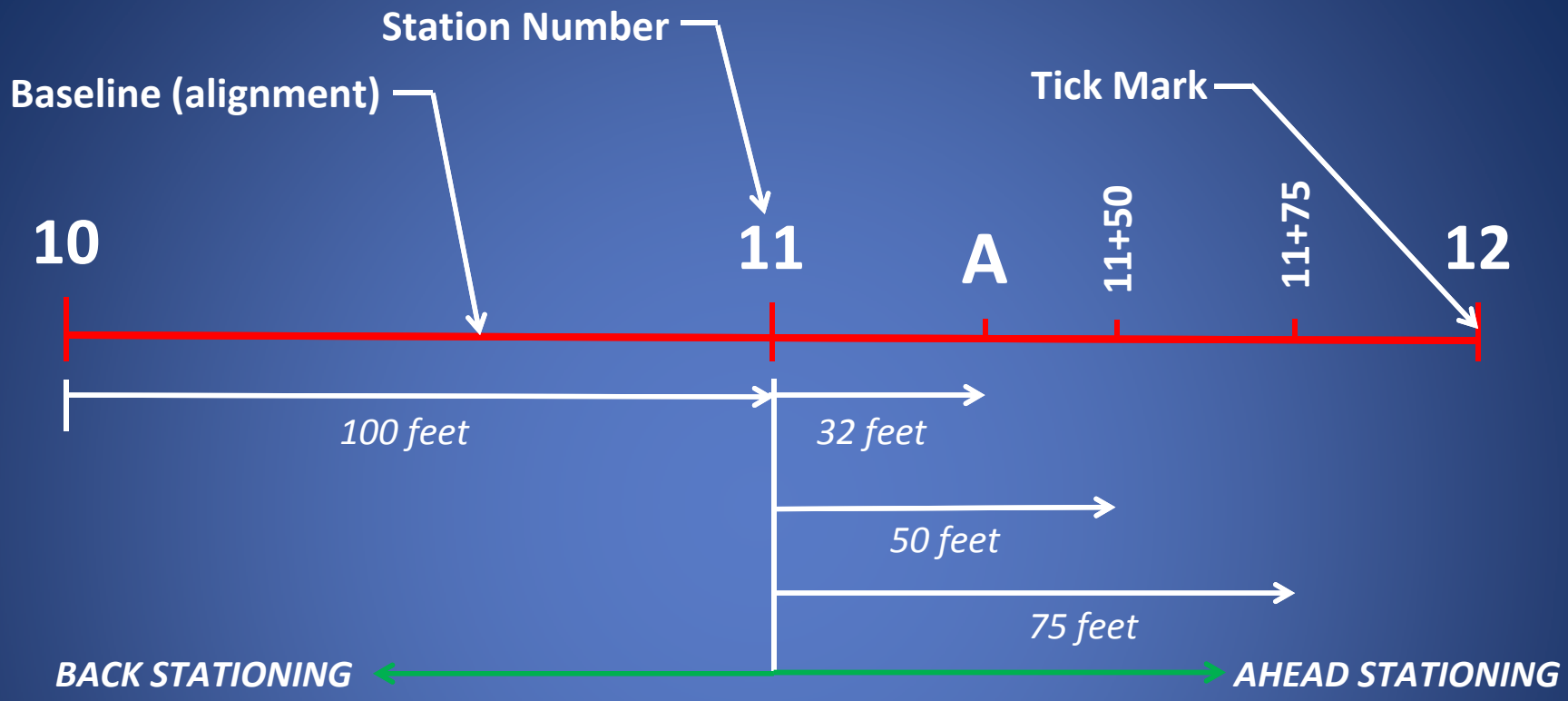
- Station
- Earthwork
- Elevations (Prop., Gnd., Curb)
- Hydraulics
- Paving Details
- Correlates with plan details

Part II

Plan Reading Basics

- Stationing
- Horizontal Curves
- Vertical Curves

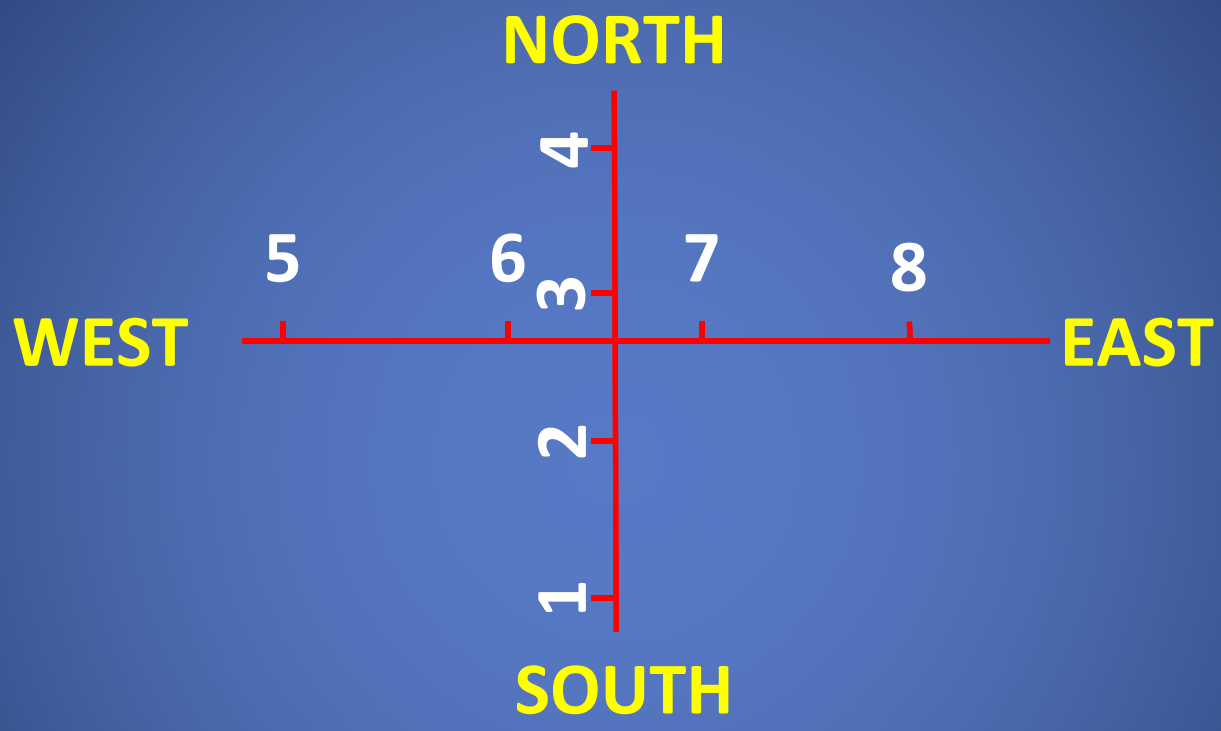
Part II Stationing



- Stationing is the process of defining locations along the project by station numbers. Highway construction projects are divided into reference points spaced along the project. These points are called STATIONS and are designated by a number such as 10 (10+00.00) or 11 (11+00.00).
- Stations are typically defined as points every 100 feet along an alignment
- Stations are written as the station number + 00 (ie. Station 10 = 10+00) (*represents some portion of 100 feet*)
- What is the stationing of Point A on the baseline above?

Part II

Stationing….continued

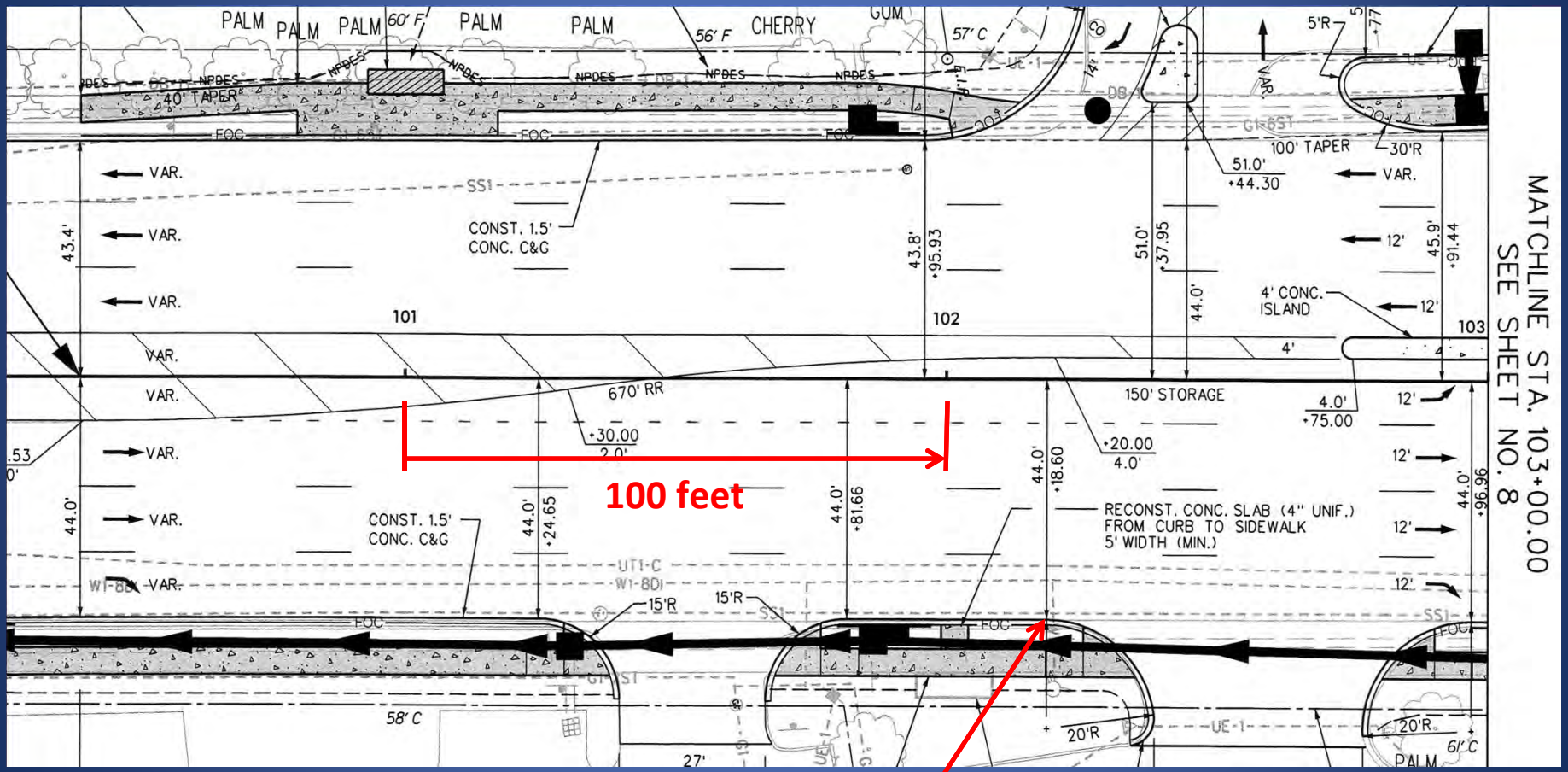


- Stationing is typically shown in a SOUTH to NORTH or WEST to EAST direction, but not always.

Part II

Stationing

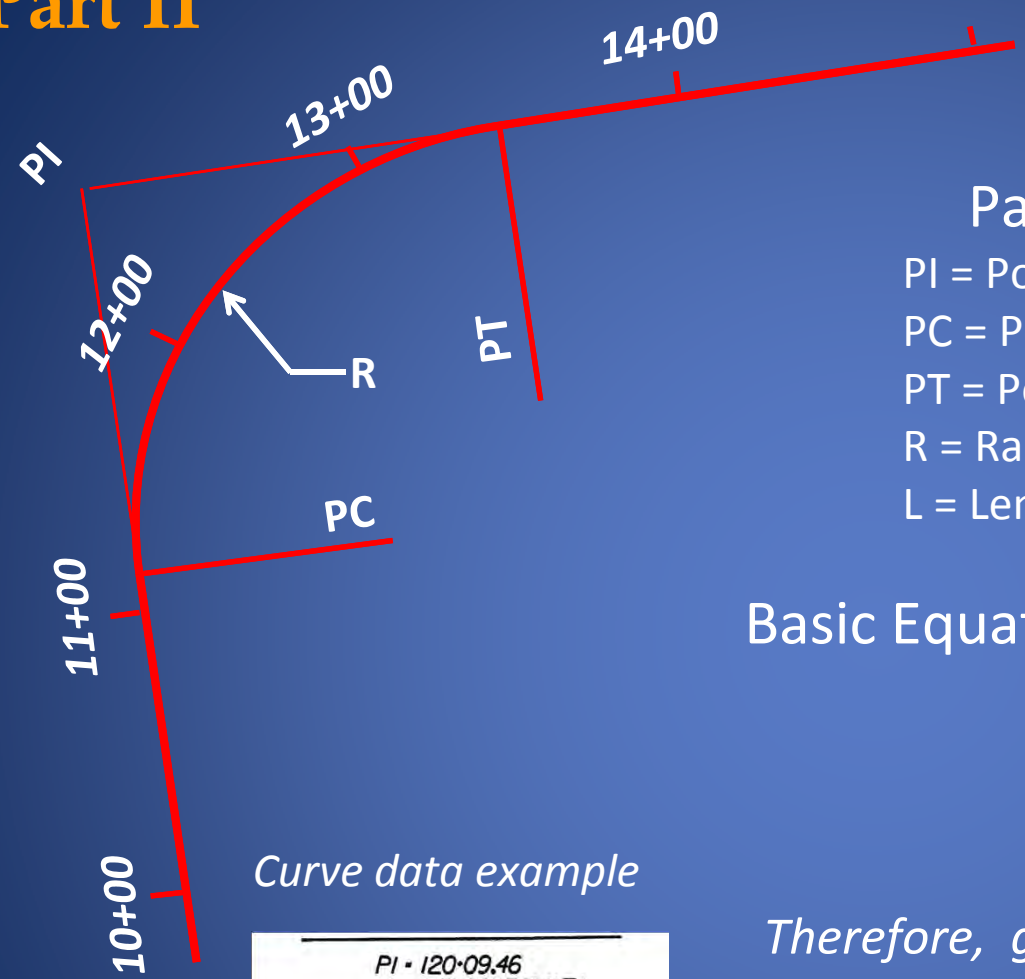
STATIONING EXAMPLE



Radius Return is at station 102+18.60, 44 feet right of the alignment

Part II

Horizontal Curves



Parts of a Horizontal Curve

PI = Point of Intersection
PC = Point of Curvature
PT = Point of Tangency
R = Radius
L = Length of Curve (given in curve data)

Basic Equation of Horizontal Curves

$$PC + L = PT$$

Curve data example

PI	120+09.46
Δ	33° 22' 58" (LT)
Dc	16° 00' 00"
T	107.38
L	208.64
R	358.10
E	15.75
DS	RETAIN EXIST.
e(MAX)	RETAIN EXIST.
e	RETAIN EXIST.
PC-LG %	RETAIN EXIST.
PT-LG %	N/A

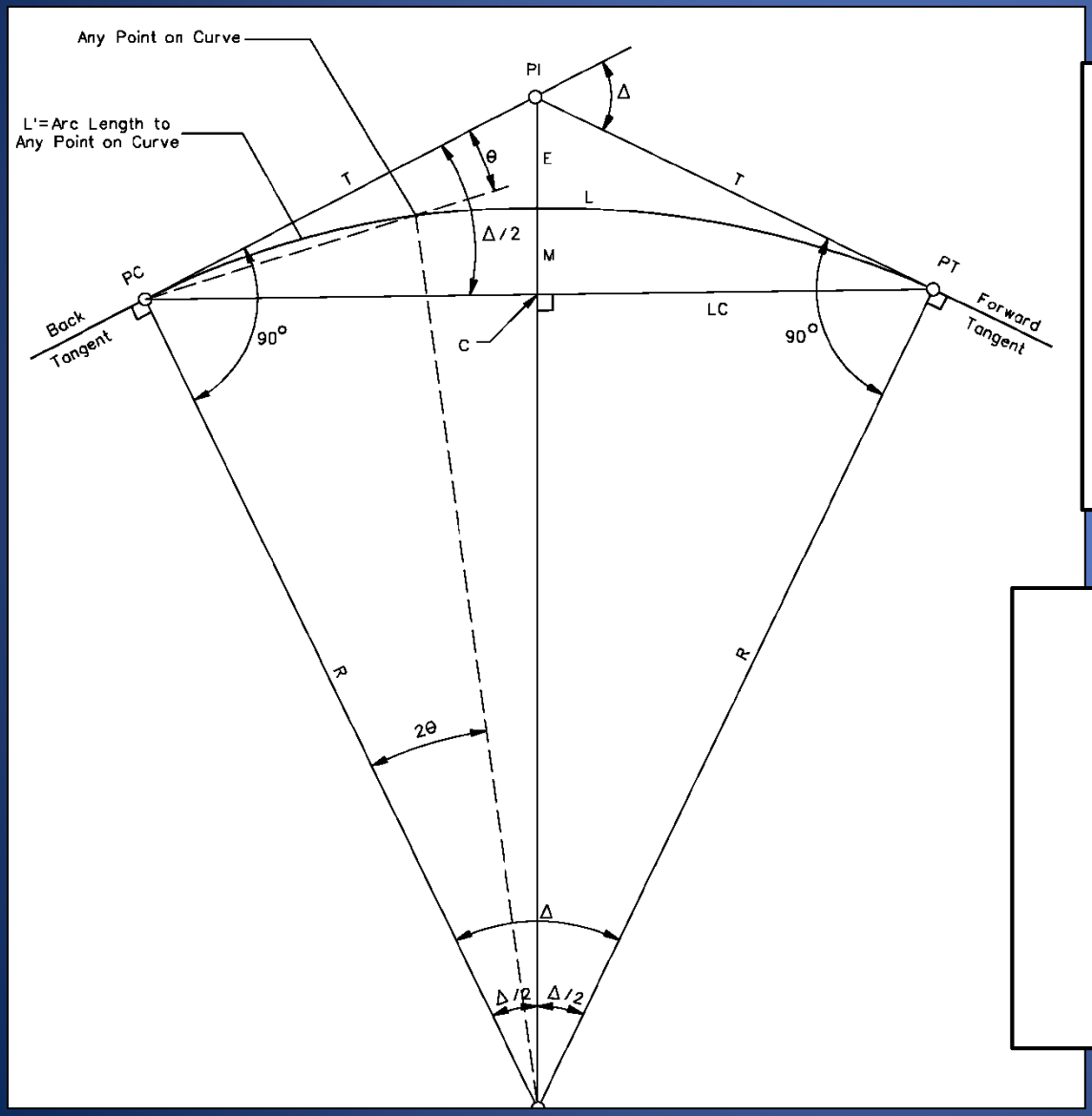
Therefore, given a PC = 11+12 & L = 218,

$$PC + L = PT$$

$$1112 + 218 = 1330 \Rightarrow 13+30$$

Part II

Horizontal Curves



PI	=	*Point of Intersection of Tangents*
PC	=	*Point of Curvature (Beginning of Curve)*
PT	=	*Point of Tangency (End of Curve)*
R	=	*Radius of Curve, feet*
C	=	*Mid-point of Long Chord*
Δ	=	*Deflection Angle Between Tangents or Central Angle, degrees*
T	=	*Tangent, Distance, feet*
LC	=	*Length of Long Chord, feet*
L	=	*Length of Curve, feet*
E	=	*External Distance, feet*
M	=	*Middle Ordinate*

$$E = T\tan\left(\frac{\Delta}{4}\right)$$

$$T = R\tan\left(\frac{\Delta}{2}\right) \quad \text{where } \Delta \text{ is expressed as a decimal}$$

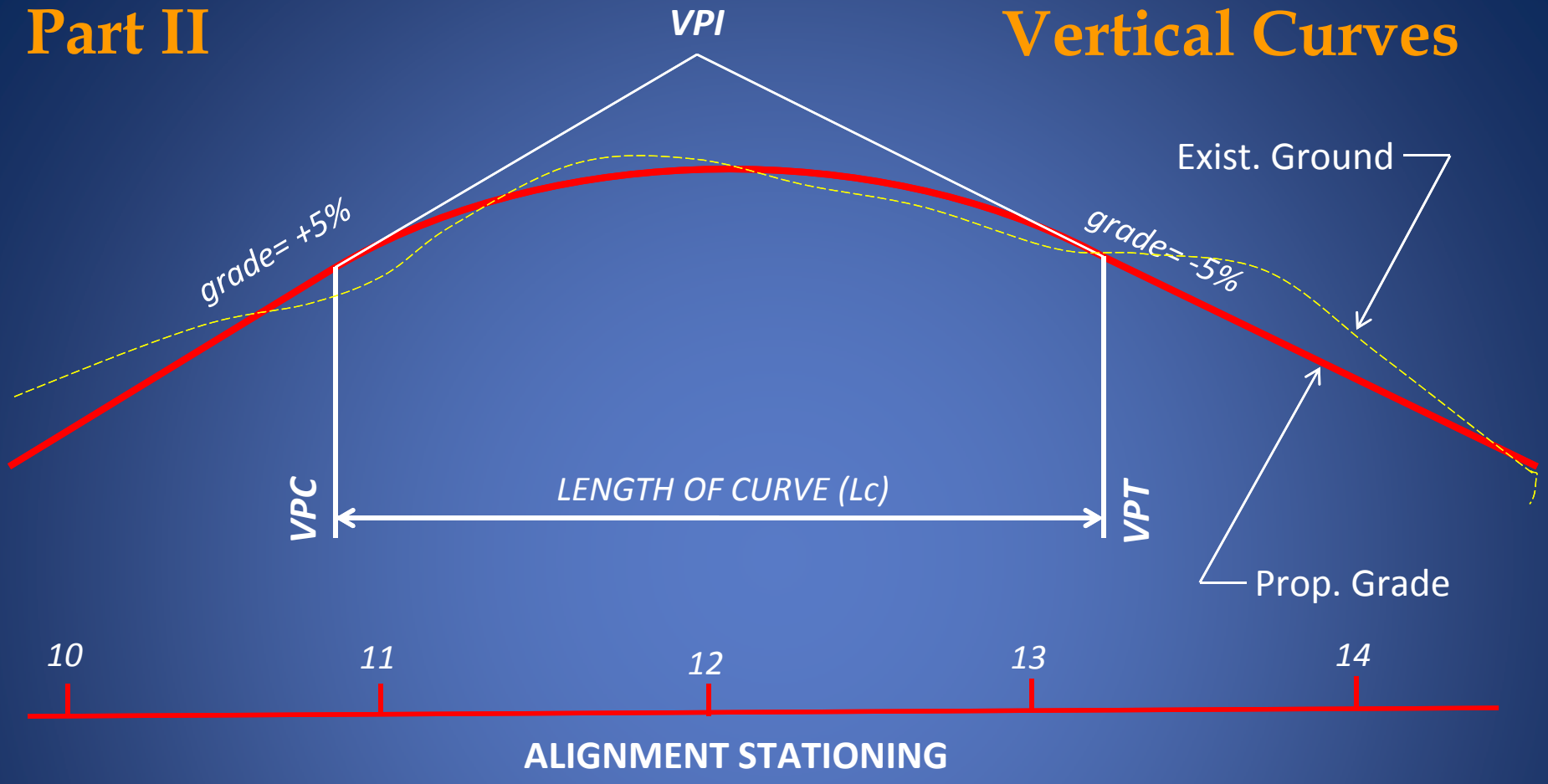
$$LC = 2T\left(\cos\left(\frac{\Delta}{2}\right)\right)$$

$$M = R\left(1-\cos\left(\frac{\Delta}{2}\right)\right)$$

$$L = \frac{\Delta R}{57.2958}$$

Part II

Vertical Curves



Basic Equation of Vertical Curves

VPC + Lc = VPT

VPI + 0.5Lc = VPT or VPI - 0.5Lc = VPC

Part III

Plan Applications

– Typical Calculations / Quantity Take-off's

Part III

Typical Calculations / Quantity Take-off's

CALCULATE PROJECT LENGTH

Given:

- **Begin Construction = STA 10+25.62**
- **End Construction = STA 189+45.72**

Find the total project length in miles.

Solution:

(18945.72 – 1025.62) / 5280 ft./mile = **3.39 miles**

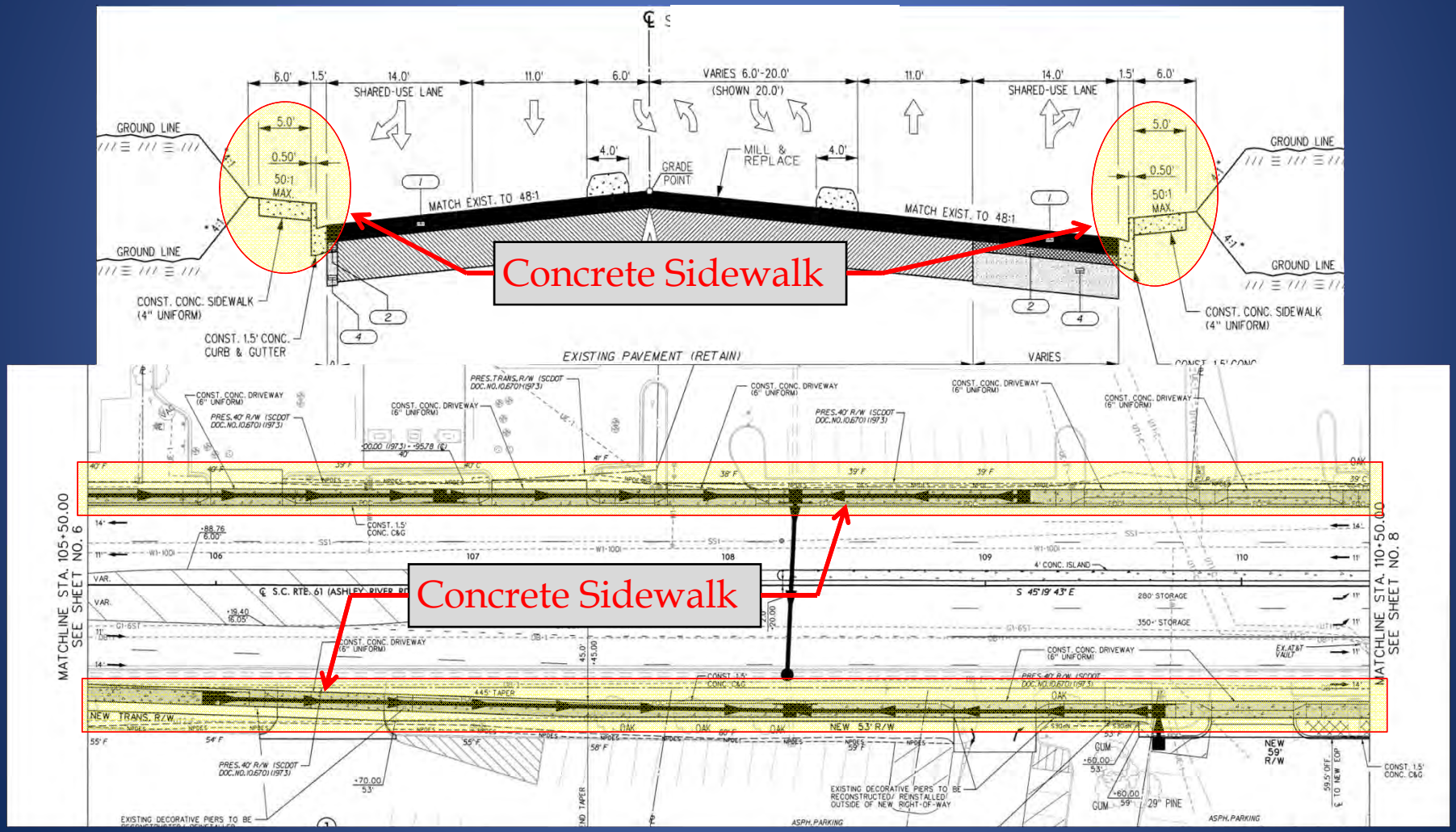
End Const. STA

Begin Const. STA

Part III

Typical Calculations / Quantity Take-off's

CALCULATE SIDEWALK QUANTITY



Part III

Typical Calculations / Quantity Take-off's

CALCULATE SIDEWALK QUANTITY…continued

Utilizing given typical section and plan view, estimate the quantity of concrete sidewalk (in SY) that would be needed for construction for the given plan sheet. Assume no driveways or catch basins in this area.

Given:

- Concrete width = 5 ft. (from typical)
- Length from plan (STA 105+50 to STA 110+50) = 500 feet

Solution:

500 ft. x 5 ft. = 2500 square feet x 2 sides = 5000 square feet

to convert to square yards, use the conversion factor or 9 SF per SY, therefore,

5000 SF / 9 SF/SY = 555.55 SY ⇨ **556 SY**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Thank you for your attendance!

Please do not hesitate to contact me with any questions.