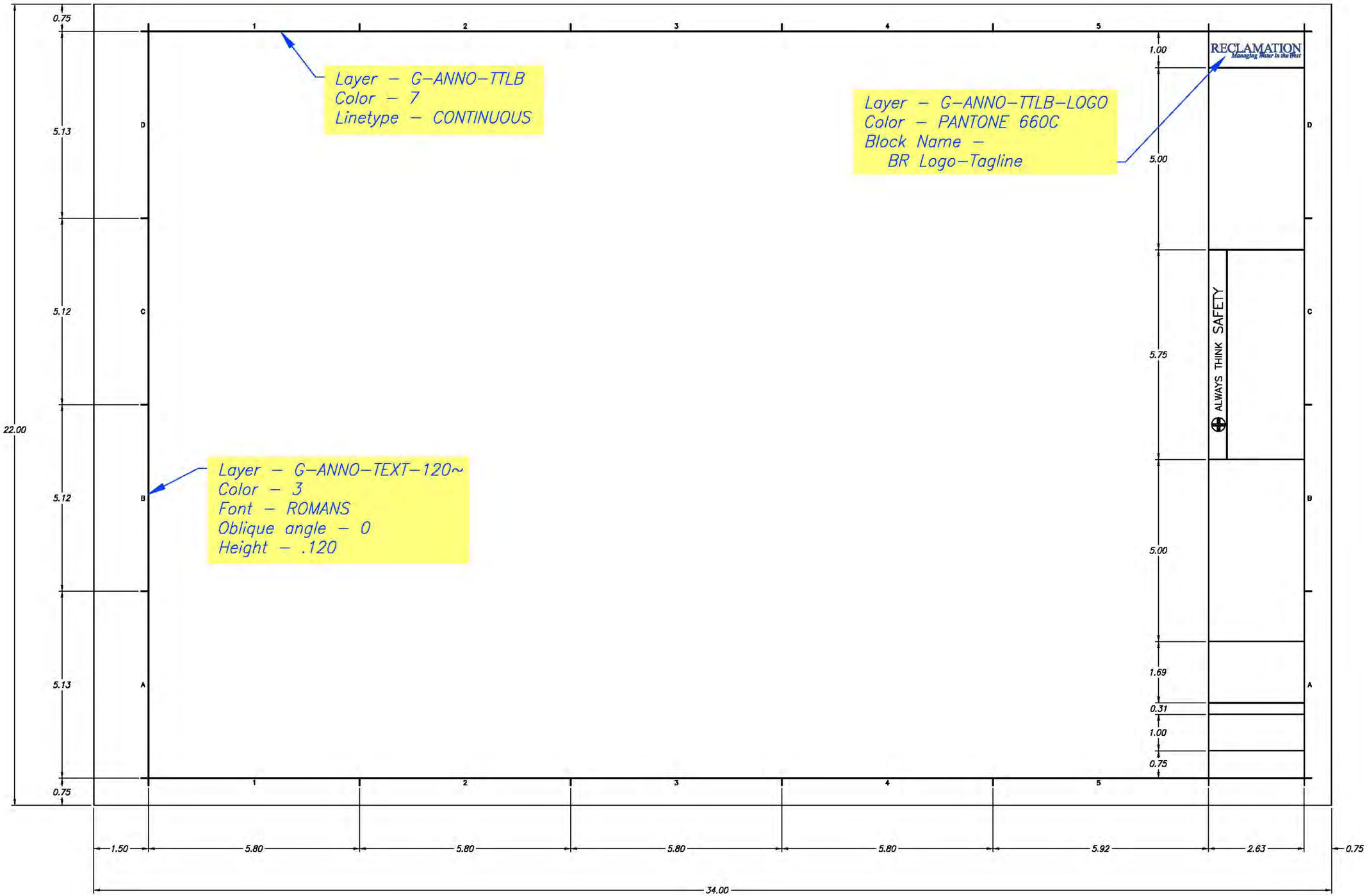
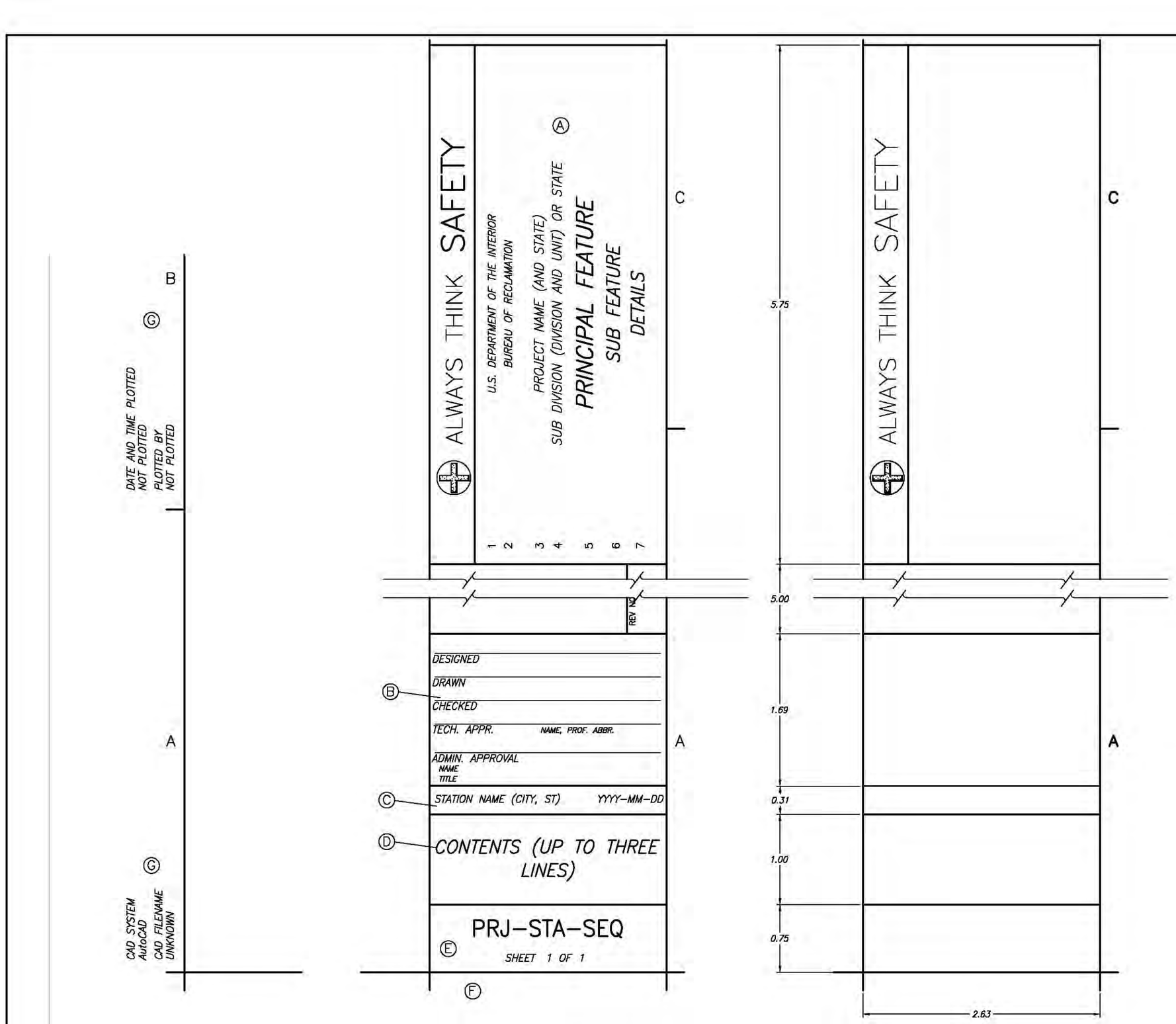


TITLE BLOCK AND BORDER

2010–12–27

FIGURE 1



LETTERING SIZE

LINE NO.	HEIGHT (inches)	LINEWORK THICKNESS (inches)	LINEWORK THICKNESS (mm) *
D SIZE DRAWINGS			
1 & 2	.080	.010	.25
3 & 4	.100	.014	.35
5	.175	.028	.70
6 & 7	.140	.020	.50
Area D	.140	.020	.50
Area B & C	.080	.010	.25
(Name–Title)	.060	.010	.25
Area E	.175	.020	.50
(Sheet No)	.080	.010	.25
Area F & G	.080	.010	.25

* Lettering on B size sheets is 50%

All lettering should be slanted 15° except the drawing number in area 5 which should use vertical lettering.

SPACING

Line 1 is located 0.23" down from the top of the title block, and line 2 is spaced at 0.18". Lines 3 through 7 are spaced at 0.35", 0.20", 0.35", 0.30", and 0.27", respectively.

A maximum of 7 lines may be used in Area 1.

SIGNATURES

Typed signatures in area 2 shall be a light weight (.010"/.25mm) with a text height of .080".

TITLE BLOCK LAYOUT

2011-01-25

FIGURE 2

SIGNATURE BLOCK ON SPECIFICATION DRAWINGS

Designer
DESIGNED
Draftsman/Technician
DRAWN
Checker
CHECKED
Team Leader or Principal Designer
TECH. APPR. NAME, PROF. ABBR.
Peer Reviewer
PEER REVIEW
NAME
TITLE

Designer
DESIGNED
Draftsman/Technician
DRAWN
Checker
CHECKED
Team Leader or Principal Designer
TECH. APPR. NAME, PROF. ABBR.
Admin. Approver
ADMIN. APPROVAL
NAME
TITLE

SIGNATURE BLOCK ON FEASIBILITY STUDY DRAWINGS

Designer
DESIGNED
Reviewer
REVIEWED NAME – TITLE

SIGNATURE BLOCK ON MANUFACTURER/CONTRACTOR DRAWINGS

MANUFACTURER or CONTRACTOR
DRAWN

ACCEPTED
NAME
TITLE

YYYY–MM–DD STA. ACCEPTED: (SIGNED NAME) NAME, PROF. ABBR.	MANUFACTURER/CONTRACTOR NAME ORIGINAL DRAWING NUMBER AND DATE SOLICITATION/SPECIFICATION NUMBER CONTRACT NUMBER

For non–Reclamation title blocks place acceptance block and drawing number in the lower right hand corner of drawing where space permits.

SIGNATURE BLOCK ON GEOLOGIC DRAWINGS

Geologist
GEOLOGY
Draftsman/Technician
DRAWN
Geologist
CHECKED
Lead or Project Geologist
TECH. APPR. NAME, PROF. ABBR.
Principal Geologist
GEOLOGIC APPROVAL
NAME
TITLE

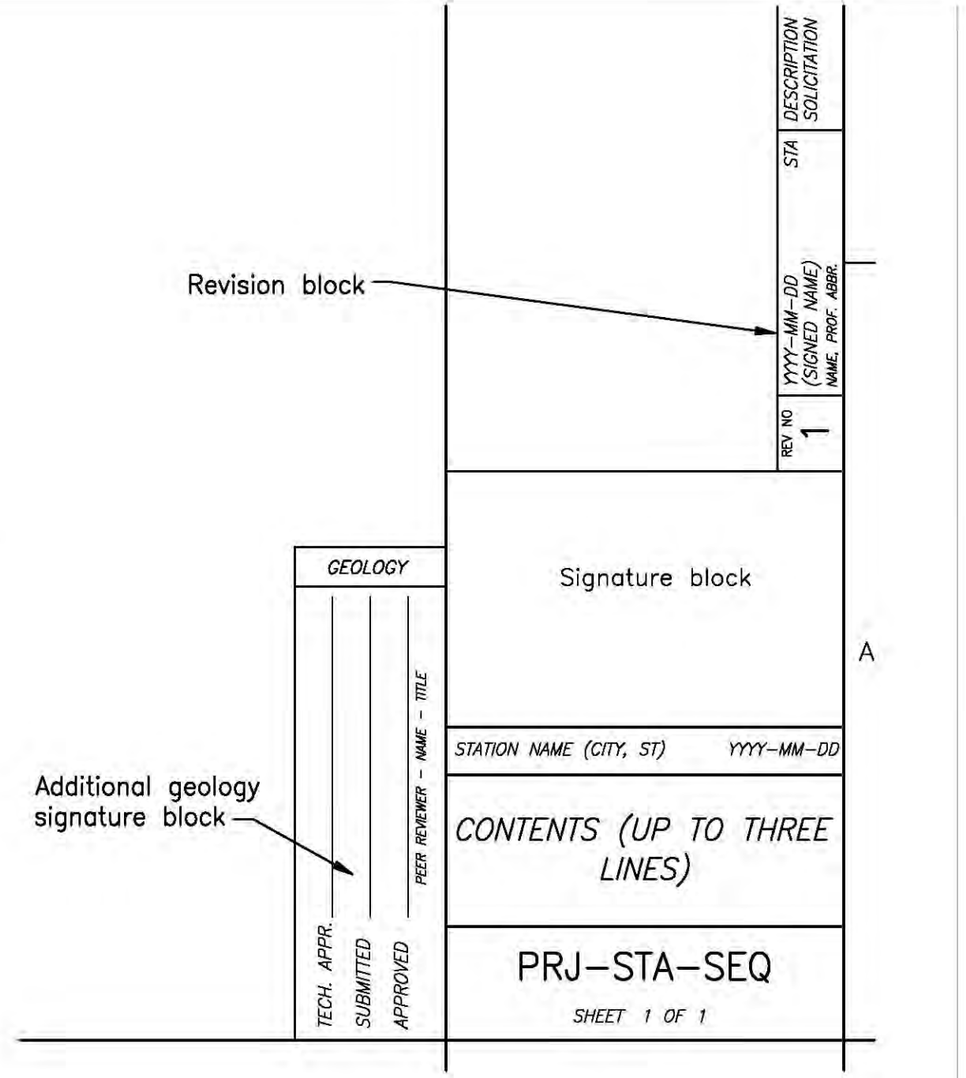
Additional signature block on specification drawings with geologic overlays or drawings prepared in the field and approved by Denver Technical Service Center

TECH. APPR. _____
SUBMITTED _____
APPROVED _____
NAME – TITLE
GEOLOGY

SIGNATURES ON REVISION BLOCKS

REV NO 2	YYYY–MM–DD STA (SIGNED NAME) NAME, PROF. ABBR.	DESCRIPTION OF REVISION OR AS–BUILT SOLICITATION OR CONTRACT NUMBER
REV NO 1	YYYY–MM–DD STA (SIGNED NAME) NAME, PROF. ABBR.	DESCRIPTION OF REVISION OR AS–BUILT SOLICITATION OR CONTRACT NUMBER

Date, Station and signature of Designer, Technical or Administrative Approver or Construction Engineer authorizing revision or As–Built revision



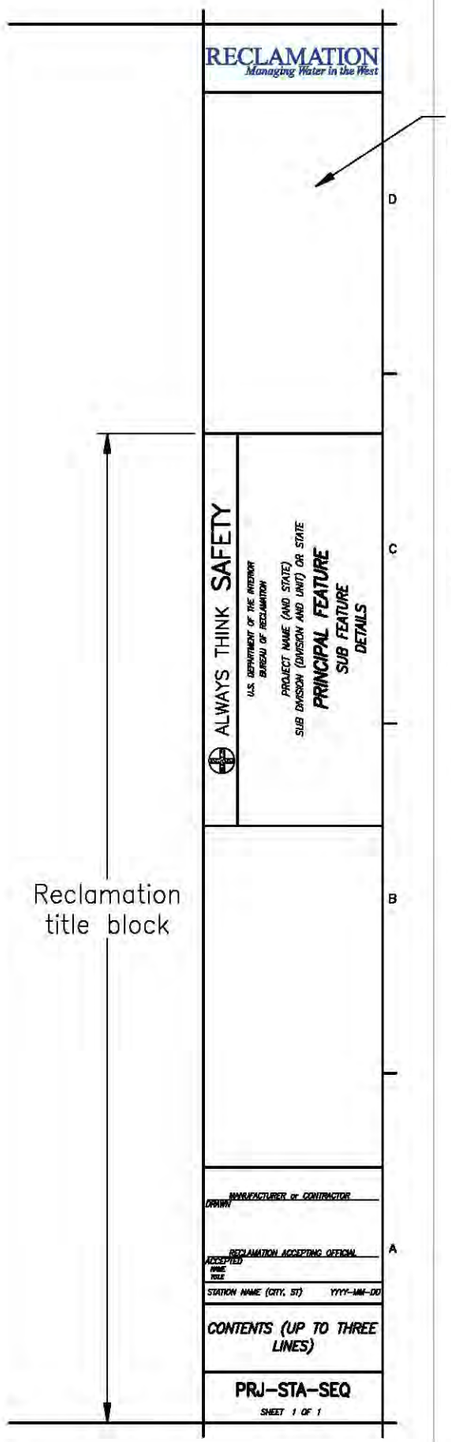
All original drawings are to be legibly hand signed on the Technical Approval and Approved lines. All other names may be typed in with a text height of .080", light line weight (.010"/.25mm).

When electronic files are revised, the above signatures are to be typed in the appropriate locations with a text height of .080", light line weight (.010"/.25mm). The typed names must match the original signatures as far as content (i.e.. full name, initials, etc.)

The Construction Engineer approving the revisions or As–Built changes will sign and date the revision block.

SIGNATORY APPROVAL

DRAWINGS WITH RECLAMATION TITLE BLOCK AND MANUFACTURER/CONTRACTOR SIGNATURE LINES



Manufacturer/Contractor title block and/or acceptance block area.

Place the word MANUFACTURER or CONTRACTOR (not the Manufacturer/ Contractor name) on the Drawn signature line. Text height = .08" light weight (.010"/.25mm).

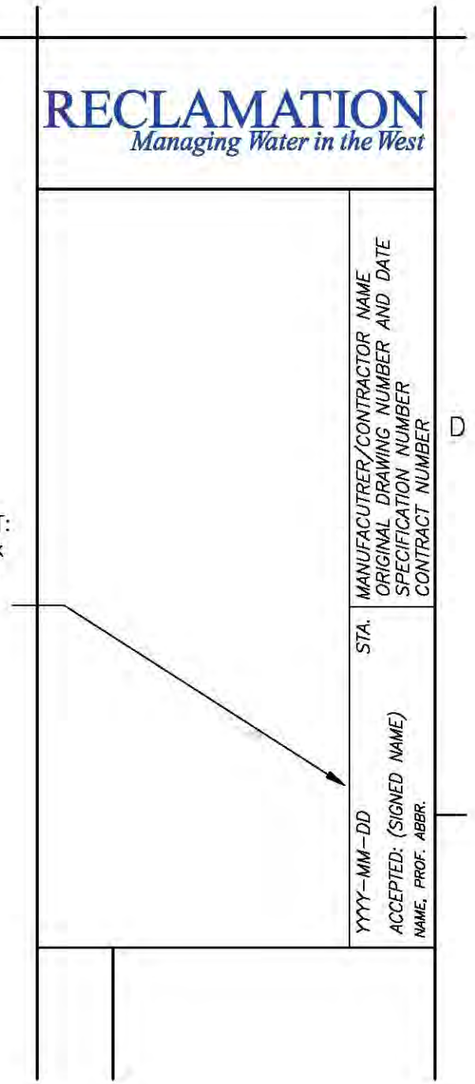
Signature of Reclamation accepting official.

Name and title of the Reclamation official who accepted the original Manufacturer/Contractor drawing.

All drawings must be assigned a unique, permanent Reclamation drawing number in accordance with the uniform numbering system.

REPLACING NON-RECLAMATION TITLE BLOCK WITH RECLAMATION TITLE BLOCK AND MANUFACTURER/CONTRACTOR ACCEPTANCE BLOCK

RECLAMATION REVISION OR AS-BUILT: Replace non-Reclamation title block and place the acceptance block in the Manufacturer/Contractor area.

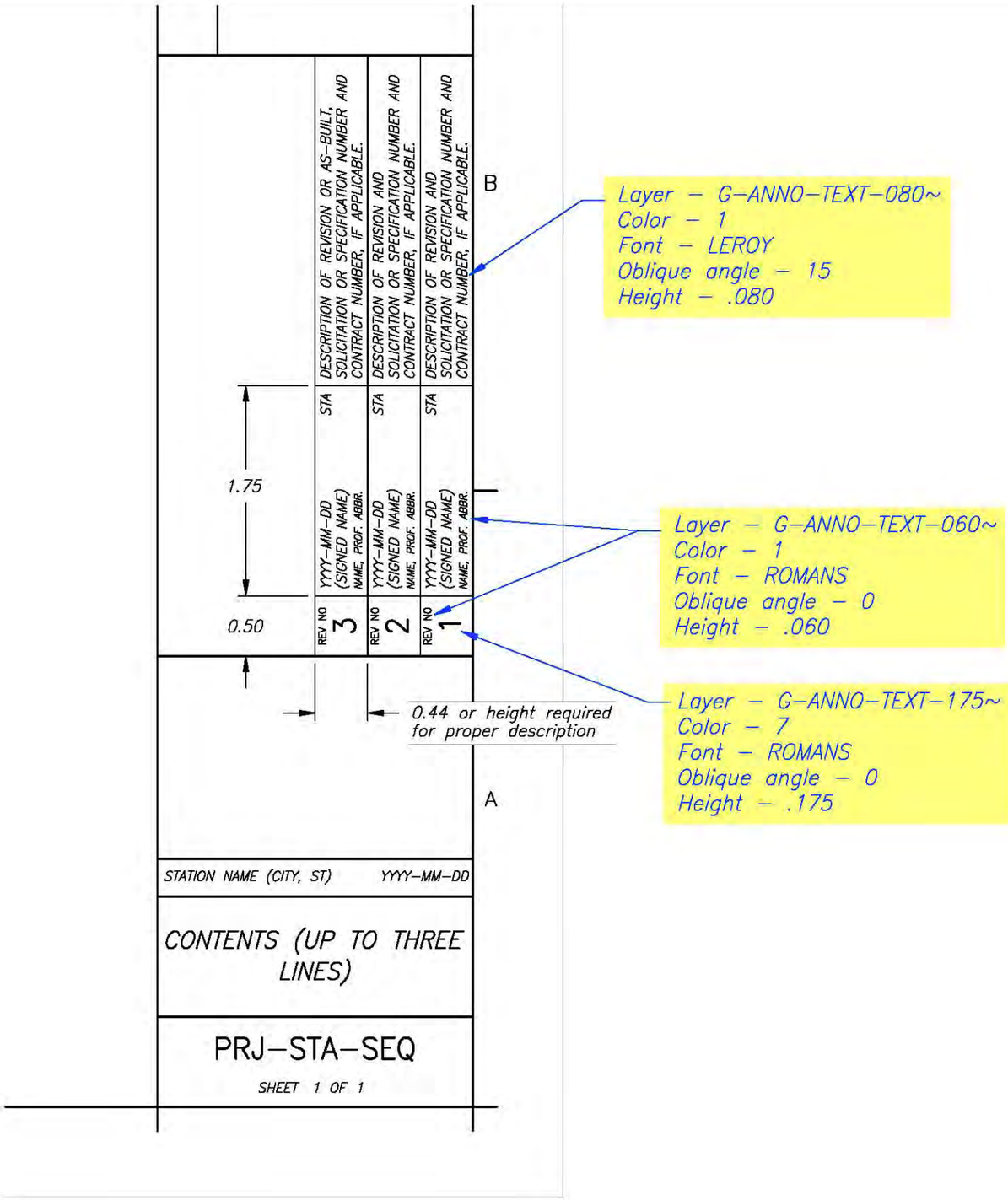


DRAWINGS WITH NON-RECLAMATION TITLE BLOCK

YYYY-MM-DD STA. ACCEPTED: (SIGNED NAME) NAME, PROF. ABBR.	MANUFACTURER/CONTRACTOR NAME ORIGINAL DRAWING NUMBER AND DATE SOLICITATION/SPECIFICATION NUMBER CONTRACT NUMBER

For non-Reclamation title blocks place acceptance block and Reclamation drawing number in the lower right hand corner of drawing where space permits.

MANUFACTURER/CONTRACTOR DRAWINGS



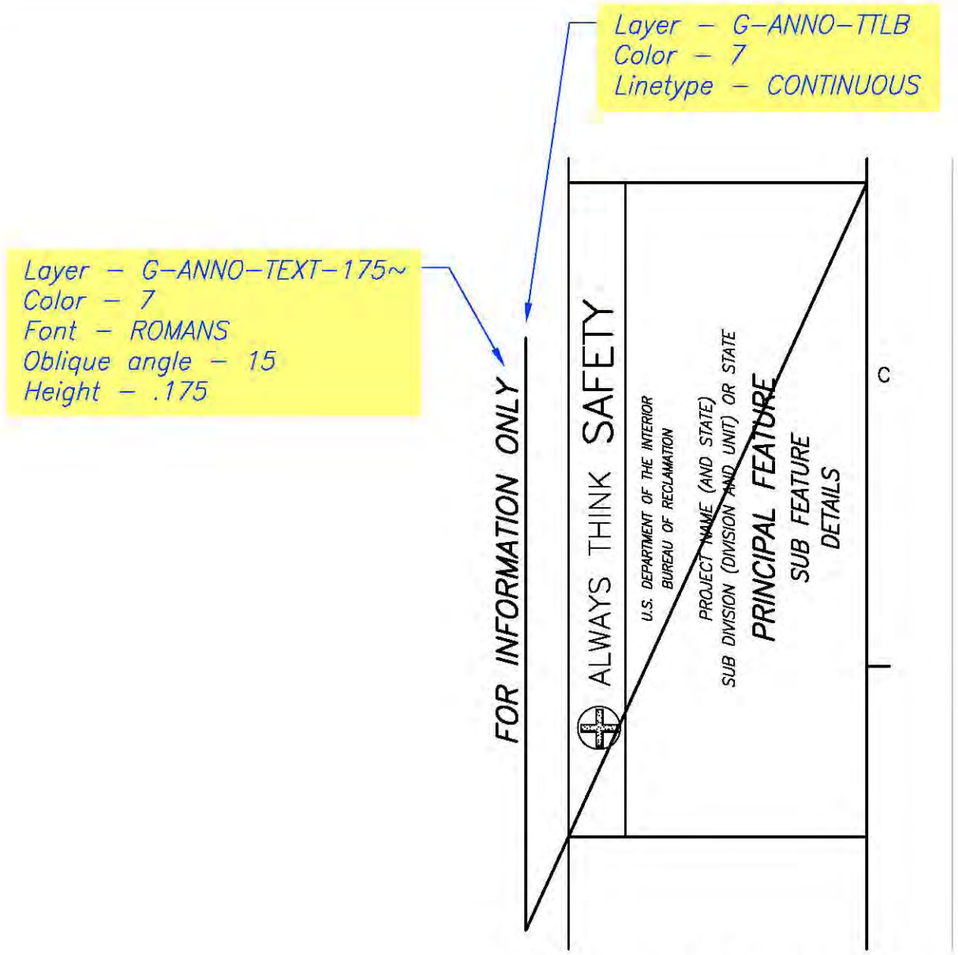
Each revision will be consecutively numbered. This will assist in identifying the most recent version. These numbers will be assigned at the time of the revision; however, when revising a drawing where no previous revision numbers have been used, the drawing manager from the Drawing and Records Group will assign a revision number based on the aperture card history file.

Revision blocks shall show the date, station number of the revising office, name and professional abbreviation of the person approving the revision, and a brief description of the drawing revisions.

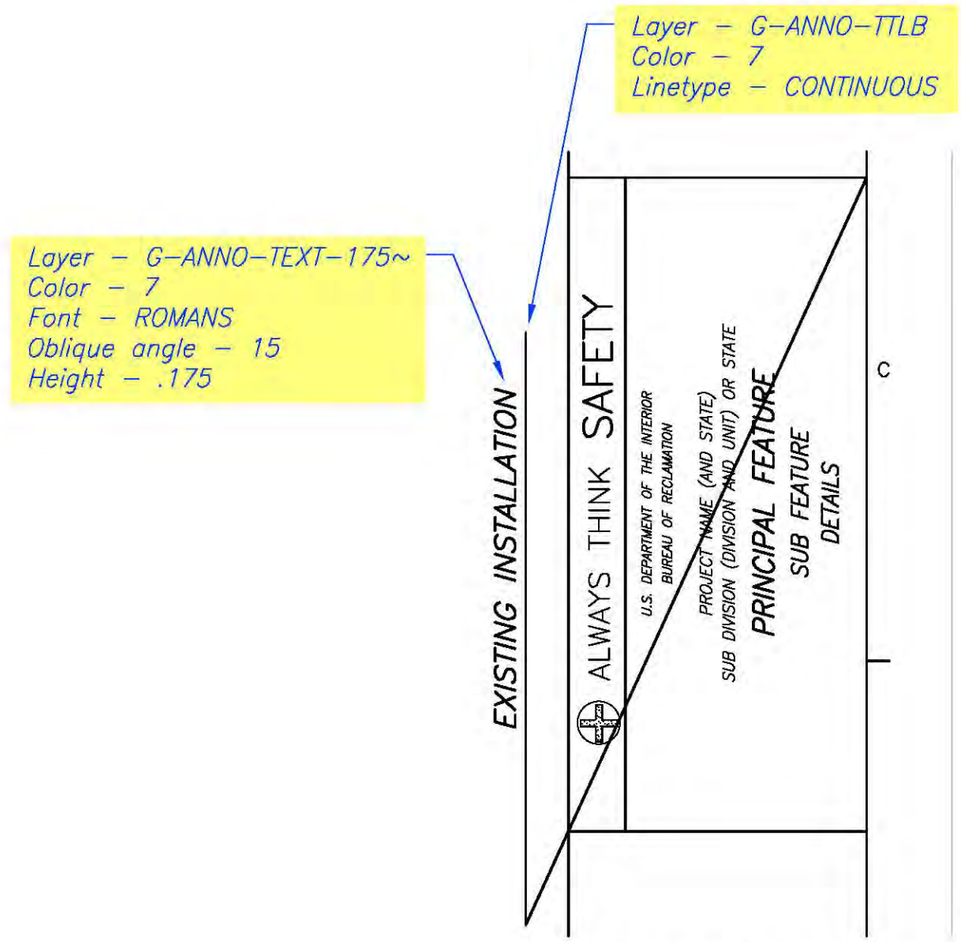
The As-Built block shall show the date, station number of the revising office, name and professional abbreviation of the person approving the revision. The As-Built station and letter date, if applicable, will be noted in the revision block. Show the solicitation or specification number and contract number in the description area. A brief description of the drawing revisions is not necessary.

As-Built blocks shall be numbered in the same manner as standard revision blocks.

REVISION BLOCK



NOTATION FOR
INFORMATION ONLY DRAWINGS

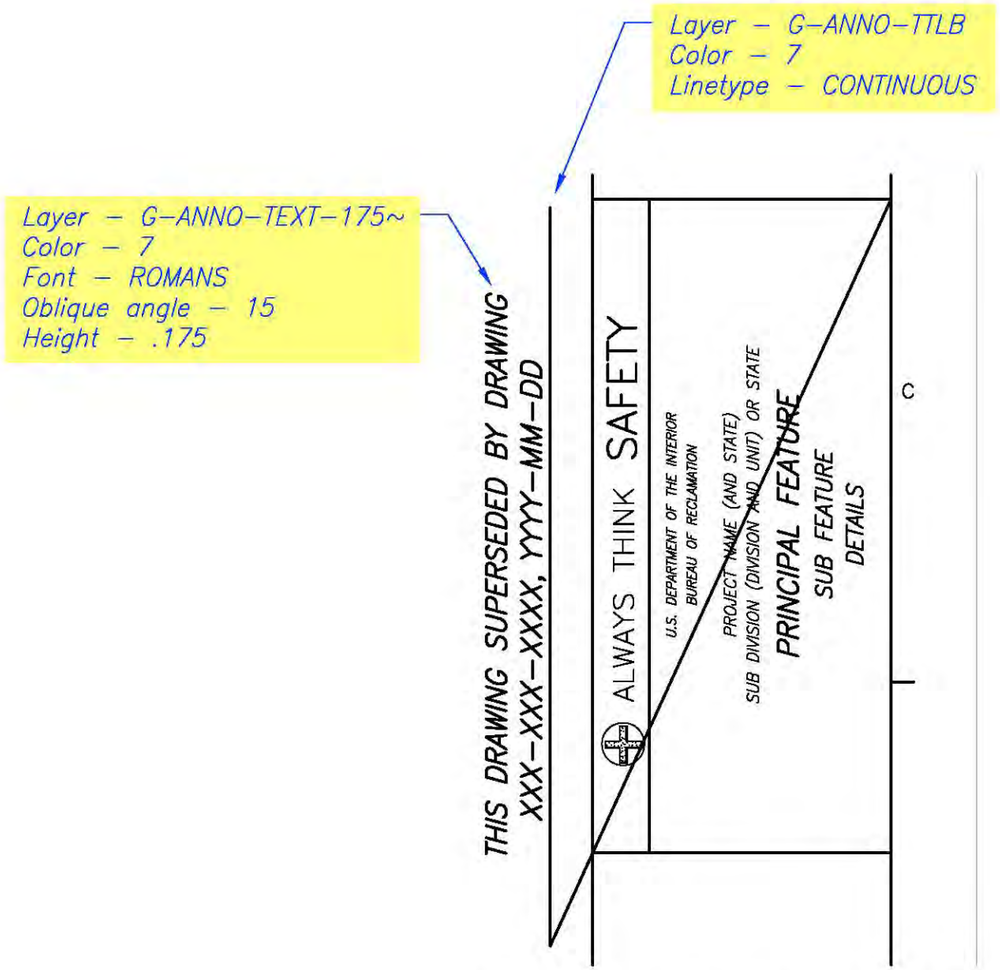


NOTATION FOR
EXISTING INSTALLATION DRAWINGS

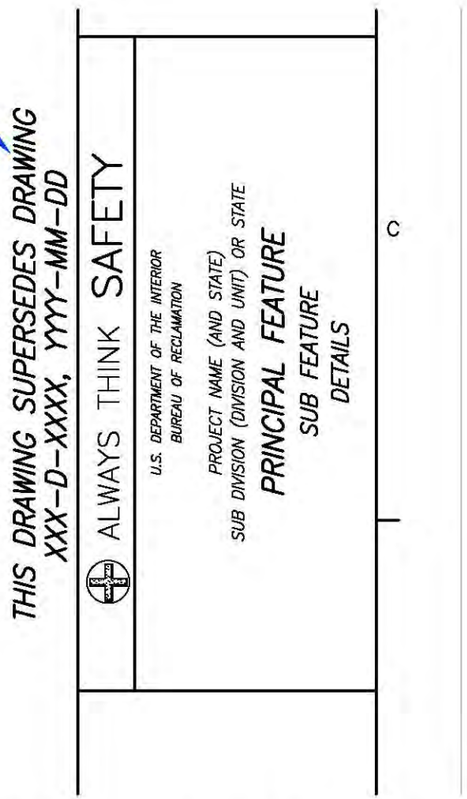
Information Only and Existing Installation drawings are copies of existing drawings that have appeared in previous Reclamation Specifications. These drawings are intended to show existing features, equipment, or installations. These drawings are created from a quality reproduction of the original specification drawing and are marked as indicated above, the original drawing is not to be modified.

If space does not permit the placement of the notation above the title block, it may be placed to the left of the title block at any convenient location on the drawing as near to the title block as possible.

MARKING INFORMATION ONLY AND
EXISTING INSTALLATION DRAWINGS

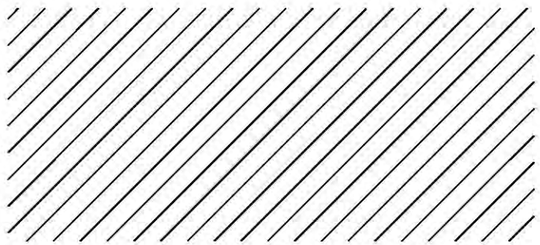


NOTATION FOR OLD DRAWING



NOTATION FOR NEW DRAWING

The portion of the drawing that is being superseded shall be indicated with a very light (.007" / .18mm) hatch. The hatch pattern shall conform with AutoCAD hatch pattern ANSI31 as shown below.



If only a portion of the drawing is being superseded, the notation on the old drawing shall be as follows.

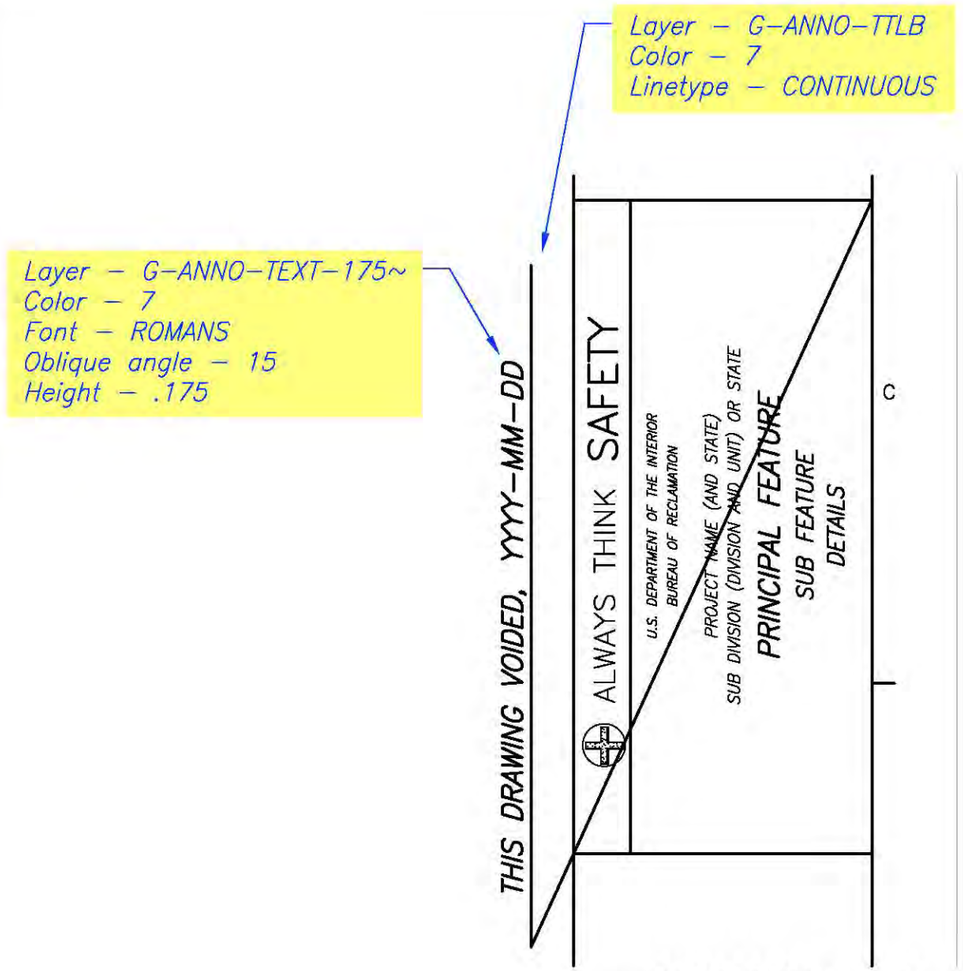
THIS DRAWING SUPERSEDED IN PART BY DRAWING XXX–D–XXXX, YYYY–MM–DD

The notation on the new drawing shall be as follows.

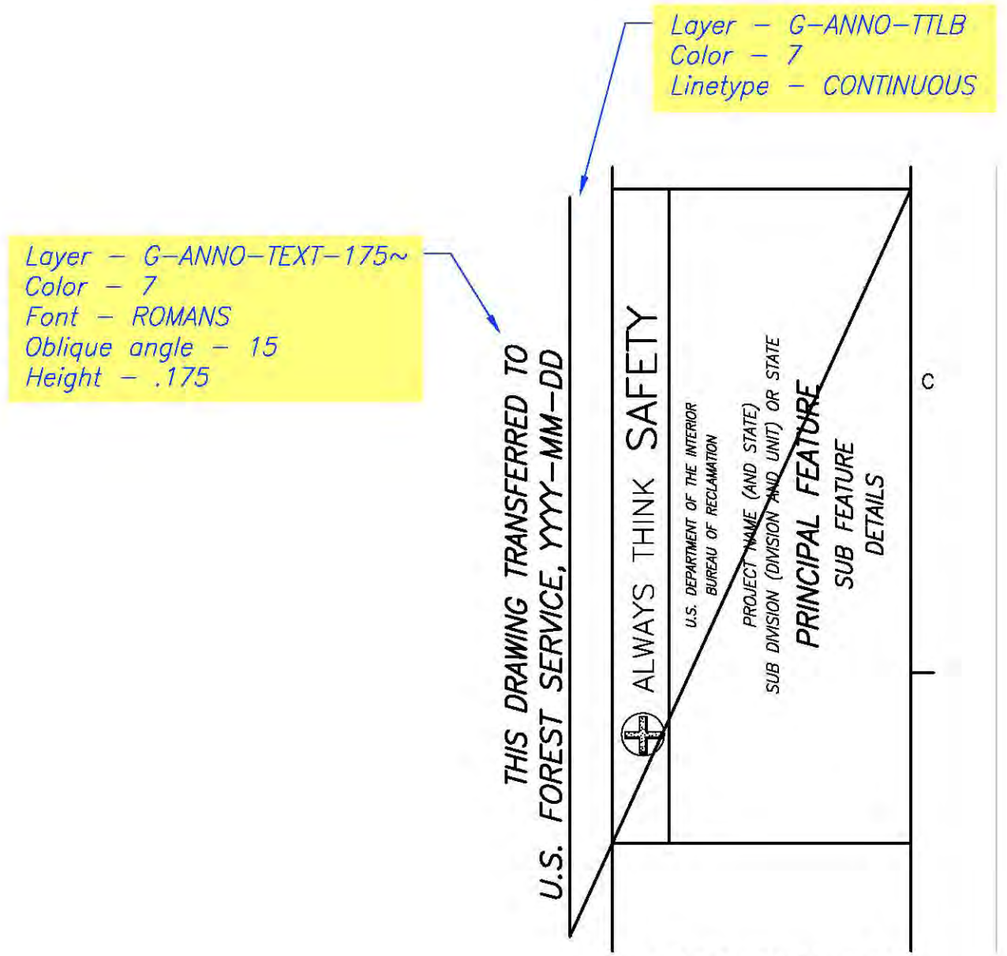
THIS DRAWING SUPERSEDES DRAWING XXX–D–XXXX IN PART, YYYY–MM–DD

If space does not permit the placement of the notation above the title block, it may be placed to the left of the title block or at any convenient location on the drawing as near to the title block as possible.

MARKING REPLACEMENT DRAWINGS



NOTATION FOR
VOIDED DRAWINGS



NOTATION FOR
TRANSFERRED DRAWINGS

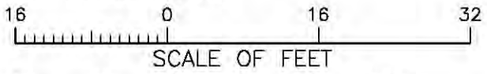
These drawings are created as a new revision of the latest revision of the drawing and are marked as indicated above. The previous revision of the drawing is not to be modified.

If space does not permit the placement of the notation above the title block, it may be placed to the left of the title block at any convenient location on the drawing as near to the title block as possible.

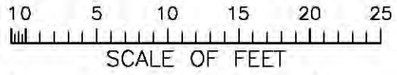
MARKING VOID OR TRANSFERRED DRAWINGS

ARCHITECTURAL

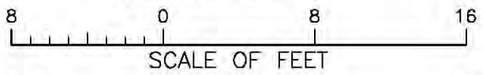
1/16"=1'



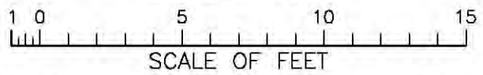
3/32"=1'



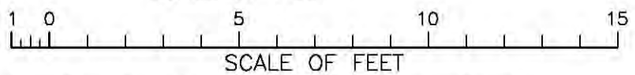
1/8"=1'



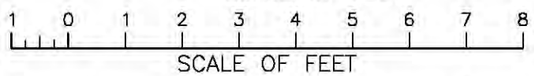
3/16"=1'



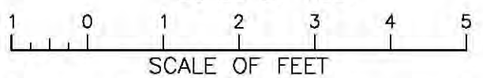
1/4"=1'



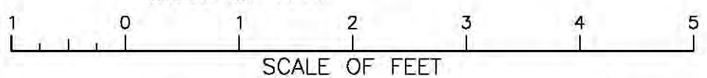
3/8"=1'



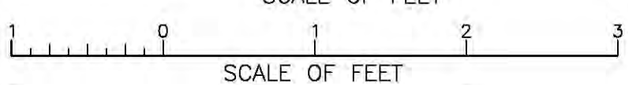
1/2"=1'



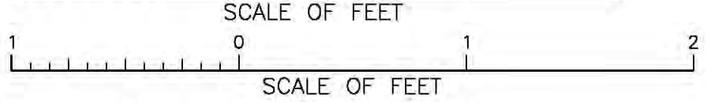
3/4"=1'



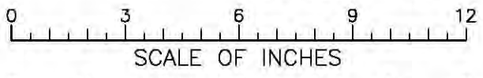
1"=1'



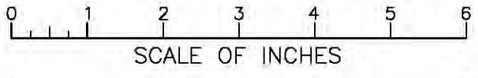
1 1/2"=1'



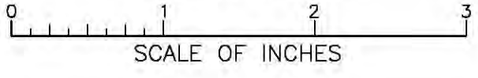
3"=1' (QUARTER SIZE)



6"=1' (HALF SIZE)

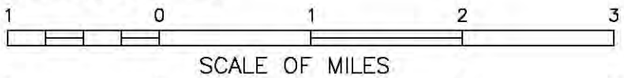


12"=1' (FULL SIZE)

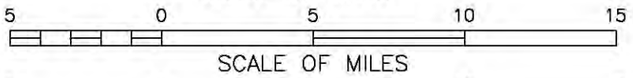


CARTOGRAPHIC

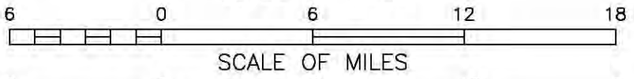
1"=1 MILE OR 1/63,360



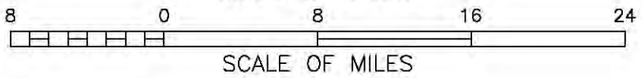
1"=5 MILES OR 1/316,800



1"=6 MILES OR 1/380,160

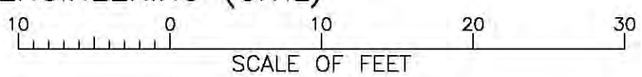


1"=8 MILES OR 1/506,880 AND
1"=16 MILES OR 1/1,013,760

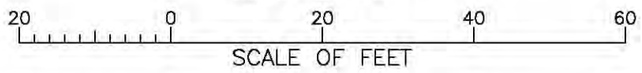


ENGINEERING (CIVIL)

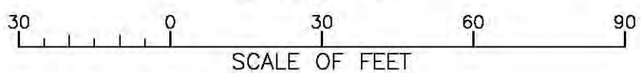
1"=10', 100', 1000'



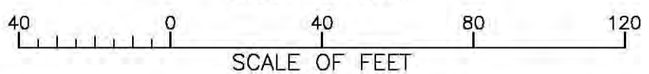
1"=20', 200', 2000'



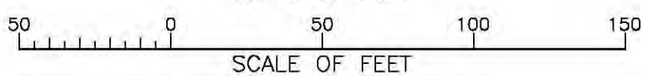
1'=30', 300', 3000'



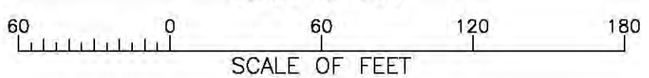
1"=40', 400', 4000'



1"=50', 500', 5000'
(Symbol DSE1F50)

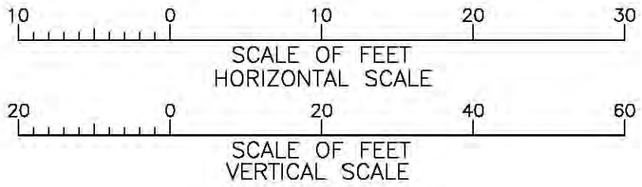


1"=60', 600', 6000'



EXAGGERATED

In cases where it is necessary to show the vertical scale differently from the normal scale of the view, the vertical scale or elevation shall be shown as follows:



Layer – G-ANNO-MISC
Color – 4

Length of all scales to be determined by the size of VIEWS, DETAILS, or MAPS with which they are to be used.

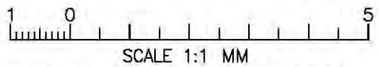
For small maps, plain bar scales may be used if desired. All drawings which contain figures shall have bar scales and/or scale ratios, or be labeled "NOT TO SCALE."

Drawings which consist of parts lists, operating instructions, or otherwise contain no figures are not required to indicate any scales.

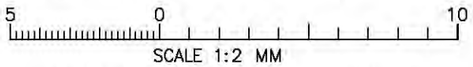
The preferred method to show drawing scales is the use of bar scales located below the corresponding VIEW, DETAIL, MAP, or near the bottom of the sheet's drawing area adjacent to the title block.

GRAPHIC SCALES
CUSTOMARY UNITS OF MEASUREMENT

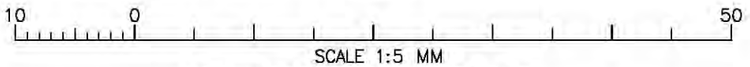
SCALES OF MILLIMETERS



1:10, 1:100, 1:1000, 1:10000 – SIMILAR



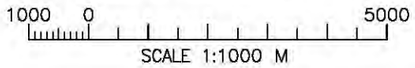
1:20, 1:200, 1:2000 – SIMILAR



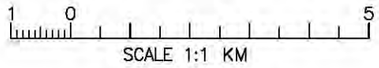
1:50, 1:500, 1:5000 – SIMILAR

EXAMPLE OF ALTERNATE SCALES

1MM = 1 000 000MM
1MM = 100 000CM



METERS



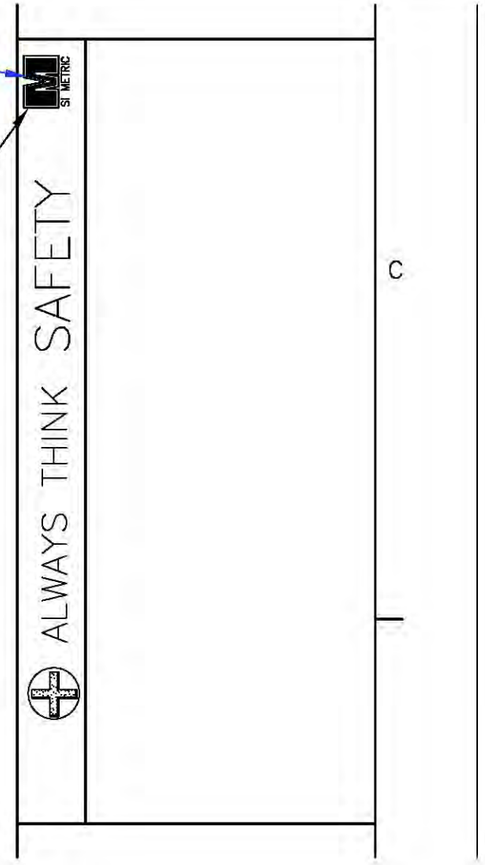
KILOMETERS

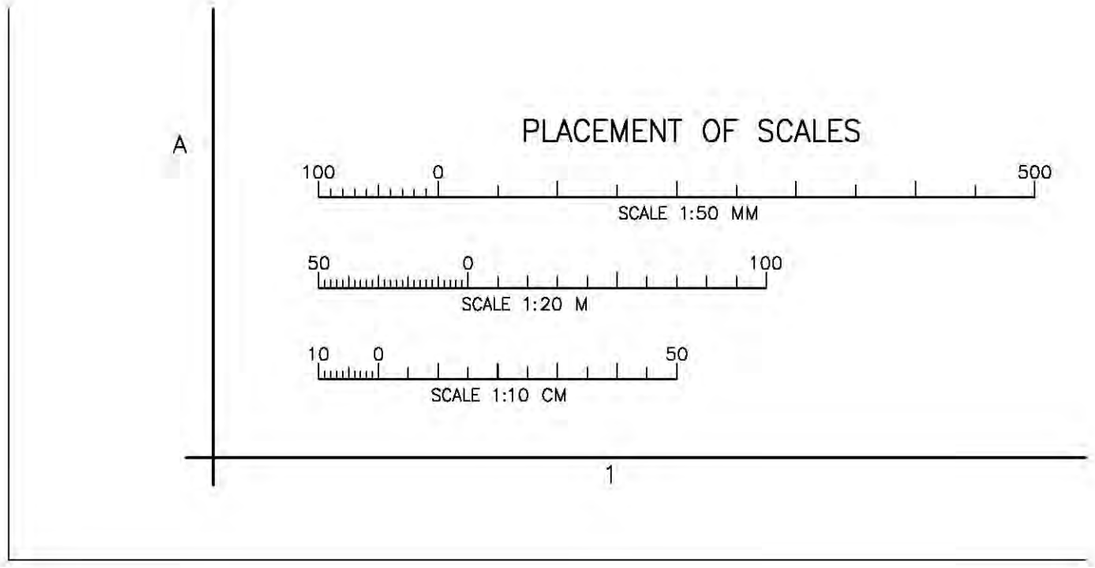
ISO STANDARD METRIC DRAFTING SCALE RATIOS

1:1 1:2 1:5	1:10 1:20 1:50	1:100 1:200 1:500	1:1 000 1:2 000 1:5 000 1:10 000

Layer – G–ANNO–TTLB_LOGO
Block Name – DMMETRI

Use symbol to designate metric drawings





All drawings which contain figures shall have bar scales and/or scale ratios, or be labeled "NOT TO SCALE."

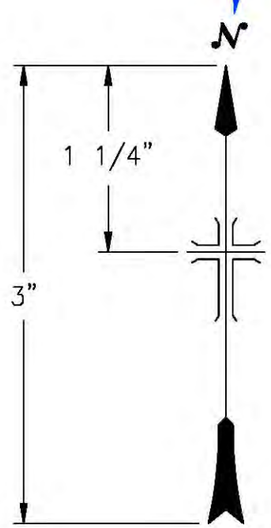
Drawings which consist of parts lists, operating instructions, or otherwise contain no figures are not required to indicate any scales.

The preferred method to show drawing scales is the use of bar scales located in the lower left–hand corner of the drawing.

Bar scales which show the length of measurements in millimeters will not require unit identification, but unit identification is encouraged. For larger scale ratios, use an alternative unit, for example, the 1:1 000 000mm bar scale should be expressed in meters or kilometers.

The bar scale used for any particular detail is identified with a note under the scale along with the scale ratio identification. The scale ratios are not shown under each detail or view.

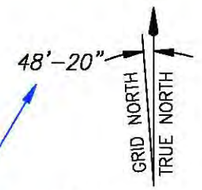
GRAPHIC SCALES
METRIC UNITS OF MEASUREMENT



STANDARD NORTH ARROW

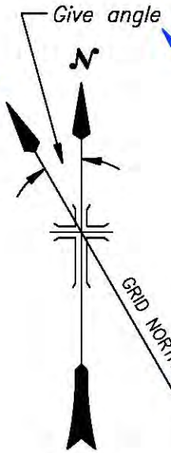
Layer – G–ANNO–SYMB
Color – 4

Layer – G–ANNO–TEXT–100~
Color – 3
Font – ROMANS
Oblique angle – 15
Height – .10



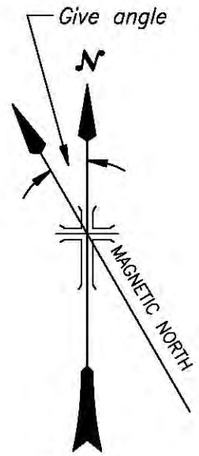
Approx. mean declination (Year)

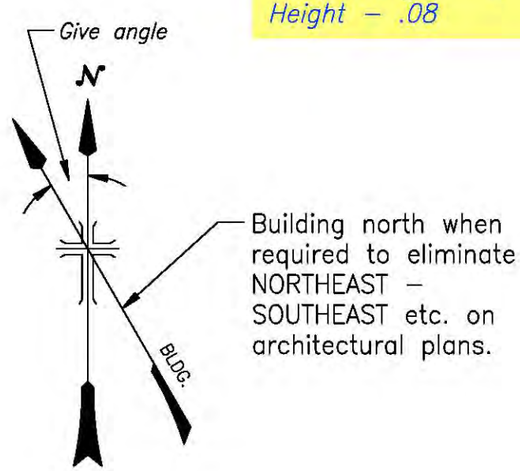
Layer – G–ANNO–SYMB
Color – 4



Layer – G–ANNO–TEXT–100~
Color – 3
Font – ROMANS
Oblique angle – 15
Height – .10

Layer – G–ANNO–TEXT–080~
Color – 11
Font – ROMANS
Oblique angle – 0
Height – .08



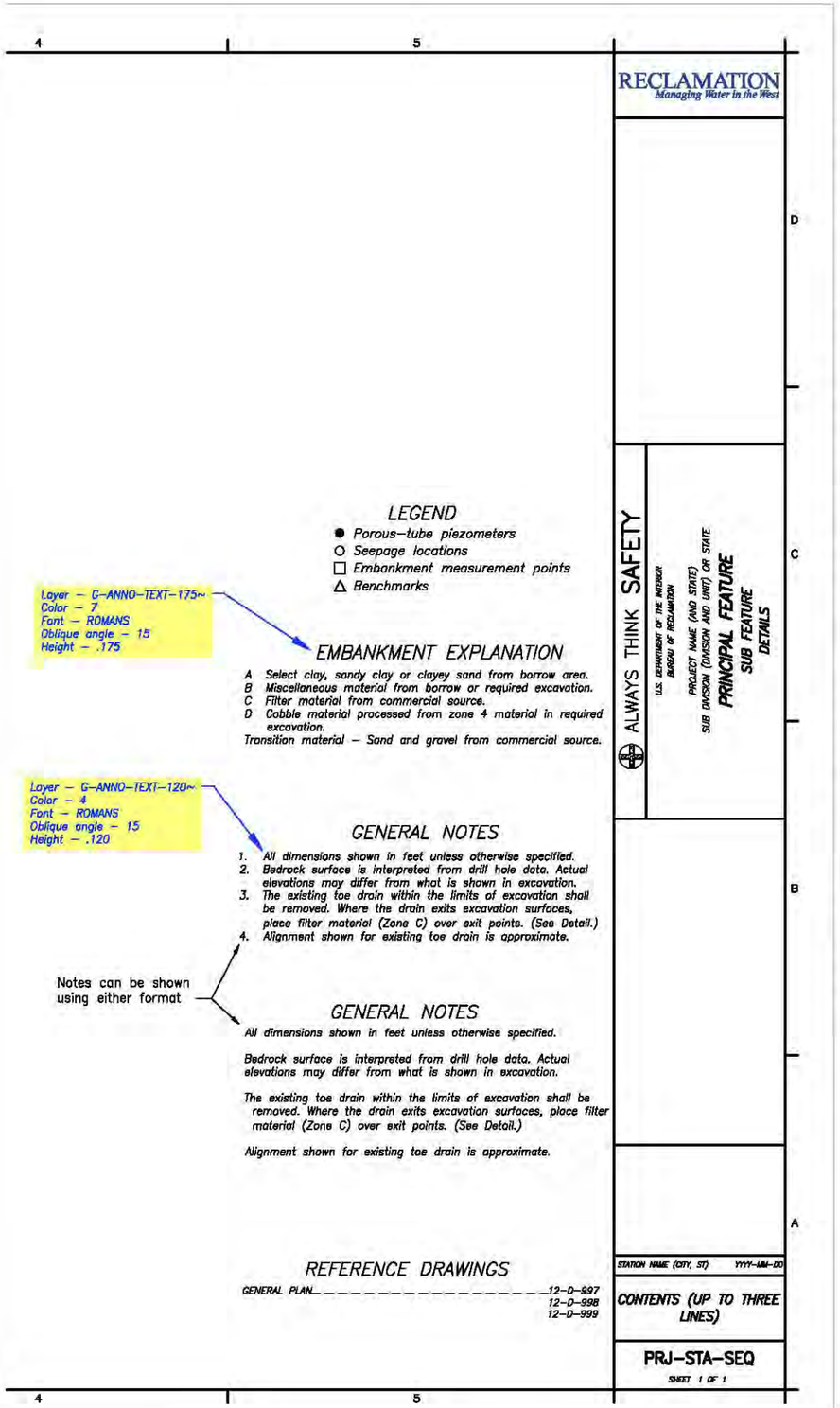


VARIATIONS OF STANDARD NORTH ARROW

Arrows may be increased or decreased in size to suit conditions or size of drawings.

Arrows should be placed in the upper left corner or right corner of the view or detail and should not obscure the drawing.

STANDARD NORTH ARROWS



LEGEND

Symbol Legend and Material Explanation should be placed on the right-hand side of the drawing above the Notes. Symbol Legend and Material Explanation should be placed on the first sheet and be referenced by all subsequent sheets. All symbols that will be used for the drawing set, with the exception of geologic features shall be shown in the explanation. General geologic legend, explanation, and notes may be shown on a separate drawing.

NOTES

All notes should refer only to the matter to which a drawing properly relates: design, construction, and kinds of materials. Where necessary to make a drawing clear, notes concerning assembling or erection methods may be included. In the case of two or more drawings pertaining to a given feature, the notes on the drawings should be carefully compared to avoid inconsistencies. Notes should use directive statements such as "Slope all piping 2%" instead of "All piping shall be sloped 2%".

Notes should be placed on the right-hand side of the drawing next to the title block area. It is up to the Designer's discretion on what method is used to separate individual notes. The individual notes may be numbered or a blank line inserted between the individual notes to help distinguish.

General Notes should be placed on the first sheet and be referenced by all subsequent sheets. General Notes are notes that apply to all drawings for the specific feature.

Any notes that reference a particular occurrence or feature should be placed on the drawing that it occurs on under the heading of "NOTES".

REFERENCE DRAWINGS

Reference Drawings should be placed on the right-hand side of the drawing next to the title block area.

All drawings for the specific drawing set shall be listed on the first sheet; any standard drawings that will be used should also be listed.

Reclamation uses the single stroke commercial roman simplex lettering style. The Leroy style used in AutoCAD drawings is based on ROMANS font. The 15° slope lettering should be used on specification and construction drawings except where a combination of vertical and slope lettering make the drawing more legible. Vertical lettering is preferred for most charts, graphs, and tables especially when they are to be used in manuals, reports, etc. Care should be exercised on any lettering .08" or smaller when drawings will be reduced to half size for publication or printing.

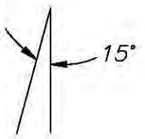
See Figure 13 for lettering used on maps.

Lettering on drawings should conform to the following sizes and line thickness:

PURPOSE OF LETTERING	HEIGHT	LINE THICKNESS INCHES	LINE THICKNESS MM
Notes. dimensions, stations elevations, part numbers	*.120"*	*.014"*	*0.35*
TITLES (SECTION A-A, DETAIL 1, NOTES, ETC.)	*.175"*	*.020*	*0.50*
SUBTITLES, NOTES UNDER TITLES	*.100"*	*.010"*	*0.25*
REVISION BLOCK DESCRIPTIONS	*.080"*	*.010"*	*0.25*

Slanted and Vertical lettering Text
Style = LEROY (Slanted), VLEROY (Vertical)
Font Name = ROMANS

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890 3/8



Greek letter used on technical charts and diagrams

Α Β Γ Δ Ε Ζ Η Θ Ι Κ Λ Μ Ν Ξ Ο Π Ρ Σ Τ Υ Φ Χ Ψ Ω
α β γ δ ε ζ η θ ι κ λ μ ν ξ ο π ρ σ τ υ φ χ ψ ω

NOTE PLACEMENT AND LETTERING SIZES

Use slanted lettering on all public works (railroads, highways, roads, trails, dams, canals, structures, transmission lines, etc.).

TEXT HEIGHT .120"

Dams, Reservoir Sites, Canals, Power Plants, etc.
Boulder Dam – Main Canal – Dewey Res. Site

TEXT HEIGHT .100"

Railroads, Highways, Electric and Telephone lines, Pipelines, Ditches, Canals, Trails, Dams, Mines, Levees, Bridges, Tunnels, Ferries, Reservoirs, etc.

Northern Pacific, U.S. 50, Colo. 75, U.L. & P. Co., Trans. Line, Diversion Dam – Siphon

TEXT HEIGHT .100" or .120"

contour elevations

Use vertical lettering on all civil divisions, surveys and hypsographic features (countries, states, counties, cities, towns, townships, land grants, mountains, valleys, canyons, buttes, etc.).

TEXT HEIGHT .175"

States, Counties, Cities, National Parks, Forests, Valleys, Mountain ranges – Utah – Denver – Adams Co.

TEXT HEIGHT .100"

Township – Range – Section numbers – Coordinates
– T. 14 S. R. 6 W. –36 – E.12,500,000
Bench marks x b.m. elevations – 1232 Stations 1+00

Use single line capital and lower case italic lettering on all hydrographic features (rivers, oceans, lakes, ponds, creeks, falls, rapids, marshes, etc.).

TEXT HEIGHT .120"

Rivers – Lakes – Oceans – Platte River

TEXT HEIGHT .100"

Creeks – Springs – Willow Creek – Beaver Creek

LETTERING FOR MAPS

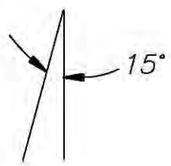
TITLES FOR GENERAL DRAWINGS AND MAPS

ELEVATION, SECTIONAL PLAN, SECTION A–A, PROFILE, HALF SECTION B–B, SECT M–M, PLAN, SECTIONAL ELEVATION, NOTES, LIST OF PARTS, ONE VALVE CONTROL, DETAIL E, ESTIMATED QUANTITIES, KEY MAP, GENERAL MAP, INDEX MAP, LOCATION MAP, VICINITY MAP, PROFILE, BIXBY DAMSITE, RESERVOIR SITE

PURPOSE OF LETTERING	HEIGHT	LINE THICKNESS INCHES	MM
TITLES (SECTION A–A, DETAIL 1, NOTES, ETC.)	*.175"*	*.020*	*0.50*
SUBTITLES, NOTES UNDER TITLES	*.100"*	*.010"*	*0.25*

Slanted lettering Text
Style = LEROY (Slanted)
Font Name = ROMANS

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890 3/8



DETAIL is rarely considered a KIND OF VIEW. Avoid the use of the words *DETAIL OF* in conjunction with name of object.

Avoid the use of the terms *VIEW*, *VIEW OF*, and *ENLARGED VIEW*.

The word *SECTION* should be abbreviated on small views *SECT A–A*.

The word *EXPLANATION* should be used in preference to the word *LEGEND* as a title or subtitle for descriptive notes with the exception of *GEOLOGIC EXPLANATION* and *LEGEND AND NOTES*.

Omit the use of quotation marks on reference designations such as *DETAIL 1*, *SECTION A–A*, etc.

FOR DETAILS REQUIRING PART NUMBERS

(3)

GEAR CASE
CAST STEEL QQ–S–681E
ONE REQUIRED – MARK 1024 – 3

FOR R.H. AND L.H. PARTS

(6 A) (7 A)

STEM
STEEL ASTM A235
ONE REQUIRED – R.H. THREAD
ONE REQUIRED – L.H. THREAD

FOR PARTS FINISHED ALL OVER

xx FINISH ALL OVER

(15)

GLAND
BRONZE QQ – C – 390
TWO REQUIRED

PART TITLE CIRCLES

5/16" – Medium line weight (.014" / .35mm)

(10) (1A) Medium line weight (.014" / .35mm), .120 high

(20 A) Medium line weight (.014" / .35mm), .100 high

INDIVIDUAL PART CIRCLES

1/4" – Medium line weight (.014" / .35mm)

(1) Medium line weight (.014" / .35mm), .100 high

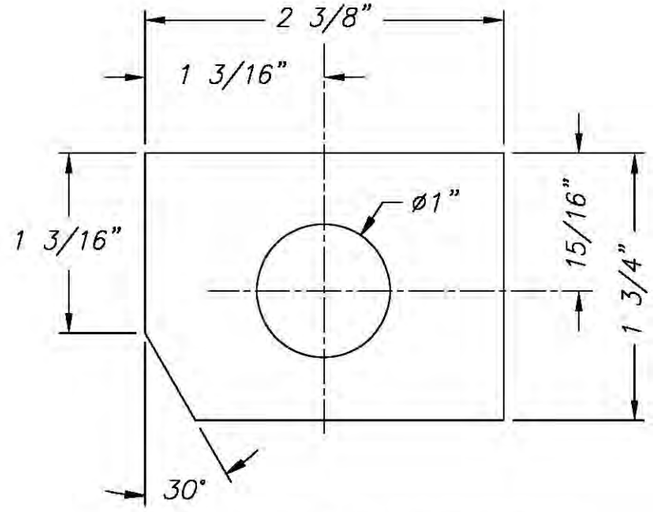
(6 A) Medium line weight (.014" / .35mm), .080 high

In subtitles only, numerals ONE thru TEN used to designate number required are always spelled out. The first line of the subtitle is the material and the material reference number. The second line is the amount required, the assembly drawing number (if needed) and the part number (if needed).

For right hand parts and left hand parts show both the R.H. and L.H. parts number.

The word REQUIRED should be abbreviated REQD.

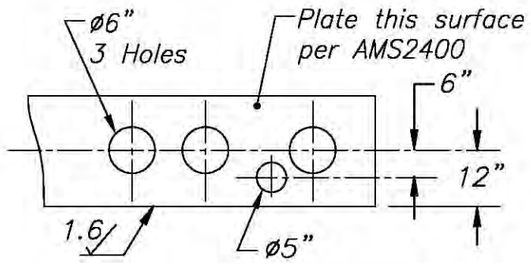
TYPICAL TITLES AND SUBTITLES



LOCATION OF DIMENSIONS

The first dimension should be located 1/2" from the object with all subsequent dimensions spaced 3/8" apart.

All dimensions shall have a gap (offset) of 1/16" from the object and shall have a 1/16" extension past the arrowhead.



LEADERS

Splined leaders may be used to distinguish between information, dimensions and objects.

Leaders for all welds and finish marks must be straight.

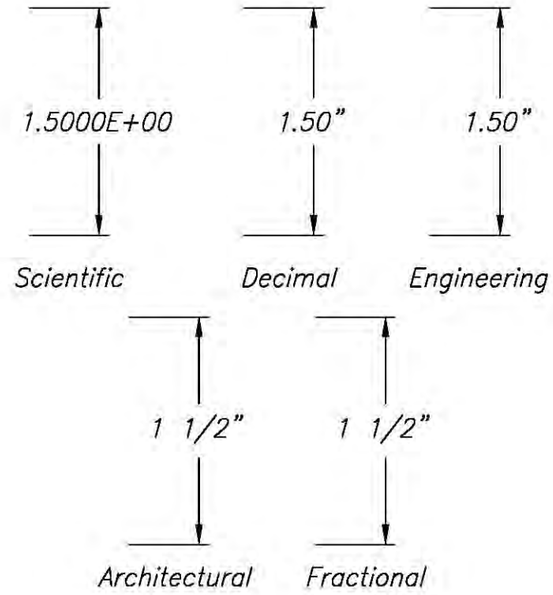
Leaders should never cross each other or any dimension lines.

ARROWHEADS

Arrowheads should be a closed filled arrow and be .13" long.

GENERAL DIMENSIONING NOTES

Dimensioning on drawings should be in accordance with ANSI Y14.5M – 1982 "Dimensioning and Tolerancing", the standard AutoCAD dimensioning style shall be BRSTD as established by the Reclamation Wide AutoCAD Steering Committee, and as illustrated below:



Decimal dimensioning is to be used for dimensioning earthwork. Dimensions should be carried out to two places.

Engineering dimensioning is to be used for dimensioning machined parts. Dimensions should be carried out to four places.

Architectural or fractional dimensioning is to be used for dimensioning structural and architectural features. See Figures 52, 53 and 54 for examples.

Dimension lines shall be broken, and the text shall be centered in the dimension.

Dimensions should be placed with the text parallel to the border.

Vertical dimensions can be placed with the text running vertical or horizontal, depending on the amount of space on the drawing.

Foot and inch marks shall be shown on all fractional dimensions, foot or inch marks shall be shown on all decimal dimensions.

OUTLINE OR BOUNDARY FOR GENERAL USE

Thickness to suit size and scale of drawing. Always sufficiently thick to print well and to stand reduction for photostat, multilith (offset), or microfilm prints.

INVISIBLE OR HIDDEN CONSTRUCTION

Light weight

DIMENSIONS AND EXTENSIONS

Light weight

CENTERLINE

Light weight

REFERENCE LINE

Light weight

PHANTOM LINE

To show adjacent parts and alternate positions
Light weight

RIGHT OF WAY

Medium weight

MATCH LINE

To show connection on separate drawings
Heavy weight

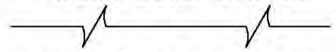
SECTION LINE

Spaced uniformly to show area in section
Very light weight

CUTTING PLANE LINE

A phantom line may be used between arrows to show trace of cutting plane on complicated sections.
See Figure 17 for Cutting Plane Standards

COMPLETE BREAK

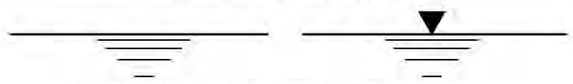


Used principally to show limits of view
Light weight

PARTIAL BREAK

Used principally to expose hidden parts
Light weight

WATER SURFACE



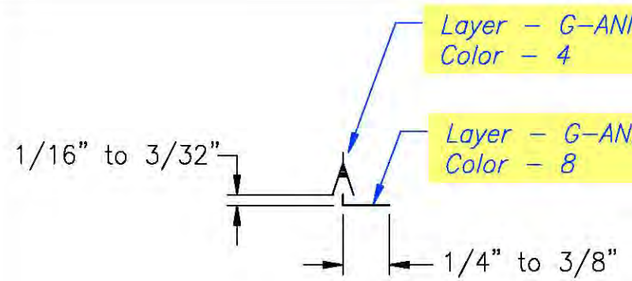
Top line to be Medium weight
Lower lines are Light weight

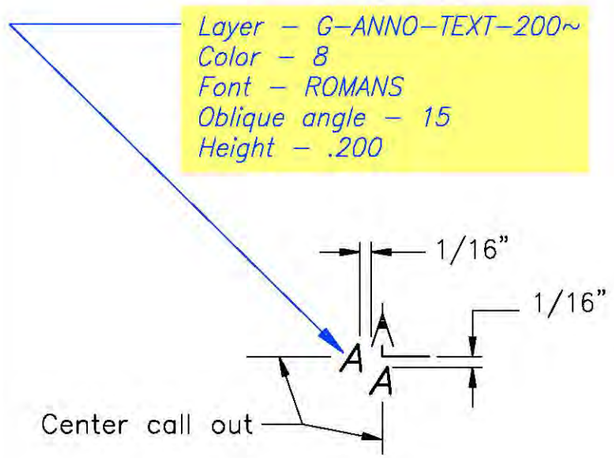
LINE WEIGHTS

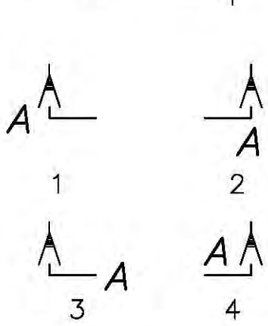
		Inches	mm
———	Very Light	(.007)	(.18)
———	Light	(.010)	(.25)
———	Medium	(.014)	(.35)
———	Heavy	(.020)	(.50)
———	Very Heavy	(.028)	(.70)
———	Bold	(.039)	(1.0)

All lines smooth, black, firm and even

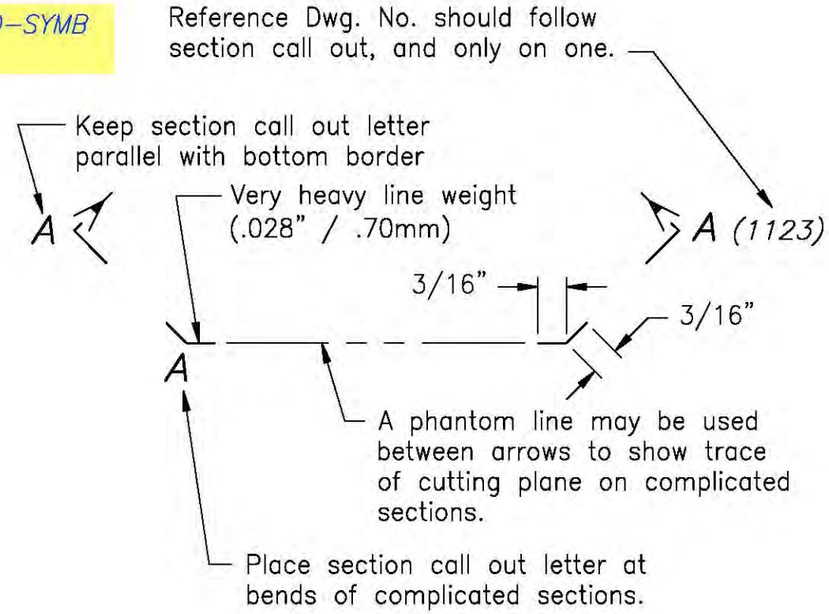
LINE SYMBOLS AND WEIGHTS



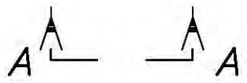




Call out letter placement priority 1 – 4

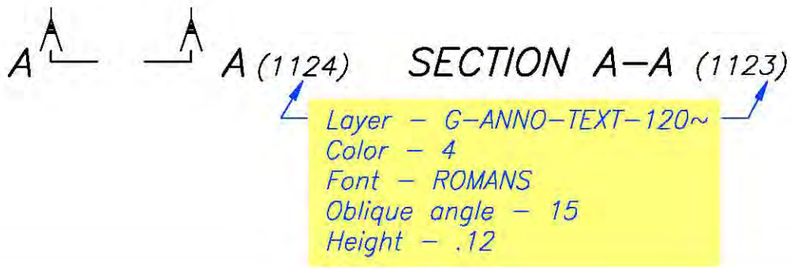


When identifying sections corresponding to a given cutting plane double letters should be used as indicated below. The letters (I), (O), or (Q) of the alphabet should not be used.

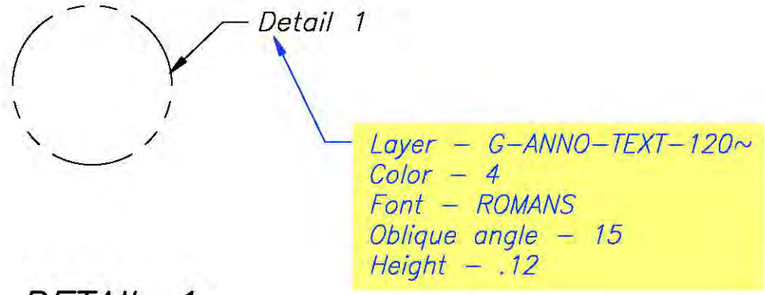


SECTION A–A

When a cutting plane is shown on one drawing and the corresponding view is on another, cross–reference the two drawings as indicated below.

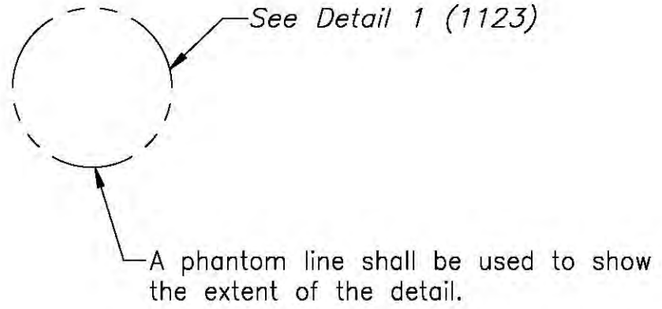


Numerals should be reserved for details as indicated below.



DETAIL 1

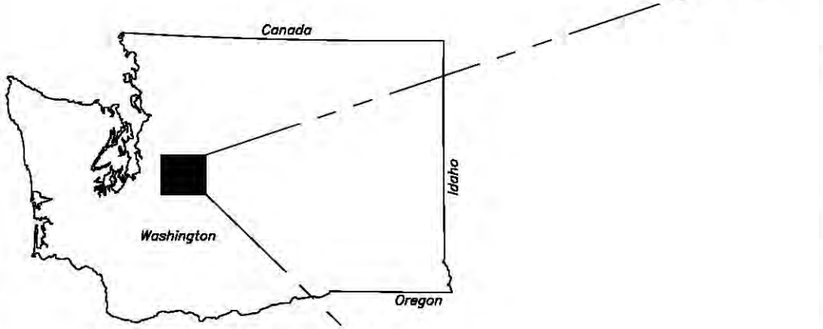
When a detail call out is shown on one drawing and the corresponding view is on another, cross–reference the two drawings as indicated below.



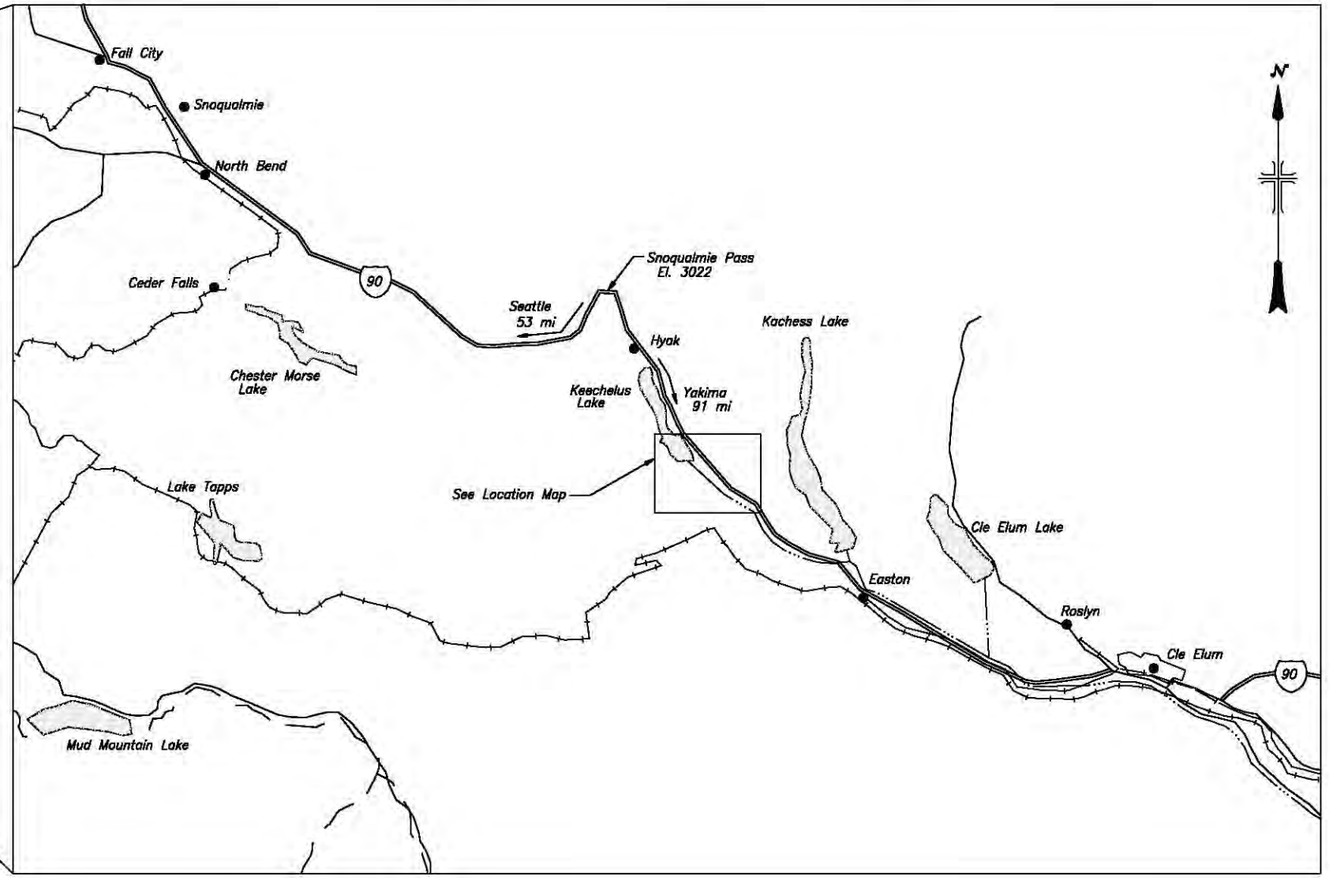
DETAIL 1 (1123)

The word "Figure" or "View" should not be used to indicate a section or detail, as it is generally used in publications to indicate an entire drawing or illustration. For Architectural symbols, see Figure 51.

CUTTING PLANE STANDARDS

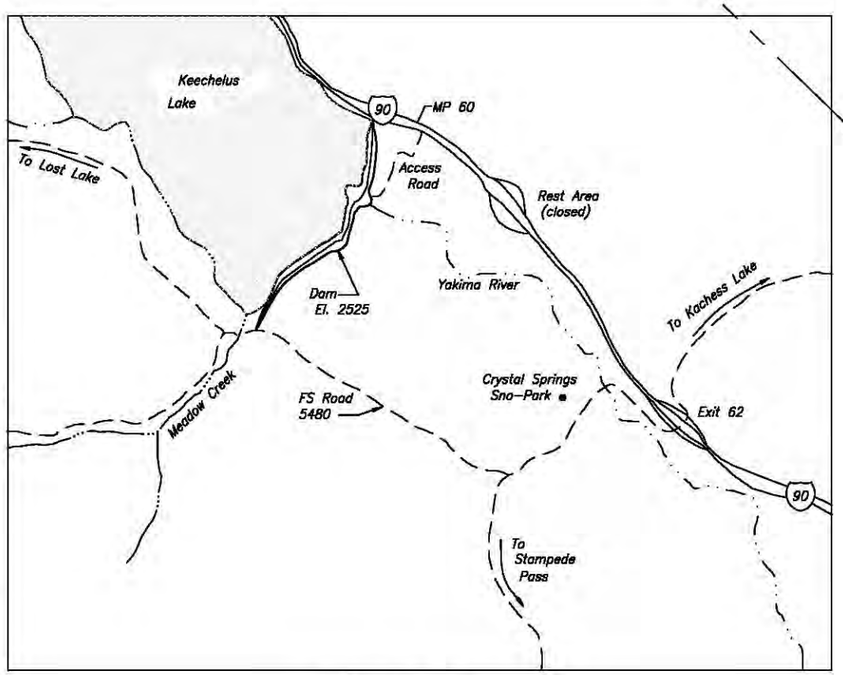


KEY MAP



VICINITY MAP

1 0 1 2 3
SCALE OF MILES



LOCATION MAP

1 1/2 0 1
SCALE OF MILES

LEGEND

- Interstate Highway
- Railroad
- River/Creek
- Paved road
- Unpaved road

Additional data that may be shown:
County or counties in which feature is located
Township and range lines
Latitudinal and longitudinal lines
Source of map

RECLAMATION
Managing Water in the West

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
STANDARD DRAWING
MONTANA

DRAFTING STANDARDS

TYPICAL LOCATION MAP

DESIGNED	
DRAWN	
CHECKED	
TECH. APPR.	NAME, PROF. ABBR.
ADMIN. APPROVAL	NAME, TITLE
BILLINGS, MT	2011-01-03

LOCATION MAP

PRJ-STA-SEQ

SHEET 1 OF 1

DATE AND TIME PLOTTED
Not Plotted
PLOTTED BY
Not Plotted

CAD SYSTEM
AUTOCAD
CAD FILENAME
UNKNOWN

2011-01-25

FIGURE 18

Layer – C–CORR–ALIN
Color – 7
Linetype – CENTER

Layer – V–STRM–PIPE
Color – 3
Linetype – CONTINUOUS

Layer – G–ANNO–SYMB
Color – 4

Layer – V–POWR–UGND
Color – 3
Linetype –Buried_Electrical_Line

Layer – C–CORR–ALIN–LABL
Color – 3
Font – ROMANS
Oblique angle – 15
Height – .120

Begin Construction
Sta. 0+00
N. = 14539.23
E. = 14810293

N 73°35'39" E

PC = 1+12.27

Pl=2+10.63
L=196.72'
R=1500.00'
Δ=7°30'52"
T=98.50'

N 81°6'31" E

PT = 3+08.99

PC = 3+44.22

Pl=4+10.34
L=132.23'
R=190.63'
Δ=39°44'36"
T=68.90

PT = 4+76.45

S 59°18'54" E

PC = 6+81.19

Pl=7+86.03
L=209.68'
R=191.00'
Δ=62°53'53"
T=116.81'

PT = 8+90.87

N 57°57'14" E

PC = 10+87.62

Pl=11+53.10
L=130.96'
R=175.00'
Δ=42°52'20"
T=68.72'

PT = 12+18.57

Match Line – Sta. 12+25

S 79°10'26" E

Station 2+75
New 24" x 60" CMP
including flared end
stations on both ends
(See 1335–600–58)

Buried electrical line

Centerline

Layer – V–SITE–FENC
Color – 3
Linetype – FENCE

Layer – G–ANNO–TEXT–120~
Color – 3
Font – ROMANS
Oblique angle – 15
Height – .120

Layer – G–ANNO–DIMS
Color – 1
Arrow – CLOSED FILLED
Arrow size – .130

Layer – C–CORR–ALIN–LABL
Color – 3
Font – ROMANS
Oblique angle – 15
Height – .120

PLAN

Layer – G–ANNO–TEXT–175~
Color – 7
Font – ROMANS
Oblique angle – 15
Height – .175

Layer – G–ANNO–SYMB
Color – 4

50 0 50 100 200
SCALE OF FEET

COLORADO STATE PLAN NAD 27

Layer – C–CORR–PROF–GDMJ
Color – 251
Linetype – CONTINUOUS

Layer – C–CORR–PROF–TTLB
Color – 13
Linetype – CONTINUOUS

Layer – C–CORR–PROF–GDMN
Color – 252
Linetype – CONTINUOUS

Layer – G–ANNO–DIMS
Color – 1
Arrow – CLOSED FILLED
Arrow size – .130

Layer – C–CORR–PROF–FGRD
Color – 4
Linetype – CENTER

Layer – C–CORR–PROF–EGRD
Color – 3
Linetype – HIDDEN

Layer – G–ANNO–TEXT–120~
Color – 3
Font – ROMANS
Oblique angle – 15
Height – .120

Layer – G–ANNO–DIMS
Color – 1
Font – ROMANS
Oblique angle – 15
Height – .120

PVI STA = 2+20
PVI ELEV = 9963.06
A.D. = 5.87
K = 26.40

155.00' VC

BVCS: 1+42.50
BVCE: 9962.69
EVCS: 2+97.50
EVCE: 9967.98

Sta. 2+75
New 24"x60" CMP

0.48%

6.35%

2.64%

BVCS: 10+70
BVCE: 10017.06
EVCS: 12+25
EVCE: 10024.03

155.00' VC

PVI STA = 11+47.50
PVI ELEV = 10021.98
A.D. = –3.71
K = 41.81

Match Line – Sta. 12+25

Finish grade centerline

Buried electrical line
Station 6+24

Existing ground

10020
10000
9980
9960
9950

ELEVATION

0+00	1+00	2+00	3+00	4+00	5+00	6+00	7+00	8+00	9+00	10+00	11+00	12+00
9962.0	9961.4	9961.8	9962.4	9963.0	9964.4	9966.0	9968.3	9972.5	9973.4	9981.0	9987.0	9990.5	9994.8	9998.5	10001.5	10004.6	10007.6	10010.9	10014.7	10018.3	10021.8	10023.6	10024.0
9962.00	9962.24	9962.48	9962.73	9963.59	9965.39	9968.14	9971.32	9974.49	9977.67	9980.85	9984.02	9987.20	9990.38	9993.55	9996.73	9999.90	10003.08	10006.26	10009.43	10012.61	10015.79	10018.85	10021.37	10023.29	

STATION

Existing ground elevation

Finished ground elevation

PROFILE

Layer – C–CORR–PROF–LABL
Color – 1
Font – ROMANS
Oblique angle – 15
Height – .120

Layer – G–ANNO–TEXT–175~
Color – 7
Font – ROMANS
Oblique angle – 15
Height – .175

DATE AND TIME PLOTTED
Not Plotted
PLOTTED BY
Not Plotted

CAD SYSTEM
AUTOCAD
CAD FILENAME
UNKNOWN

2011–02–03

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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

STANDARD DRAWING
MONTANA

DRAFTING STANDARDS

PLAN AND PROFILE DETAILS SHEET

DESIGNED
DRAWN
CHECKED
TECH. APPR. NAME, PROF. ABBR.
ADMIN. APPROVAL
NAME
TITLE
BILLINGS, MONTANA YYYY–MM–DD

PLAN AND PROFILE

PRJ–STA–SEQ

SHEET 1 OF 1

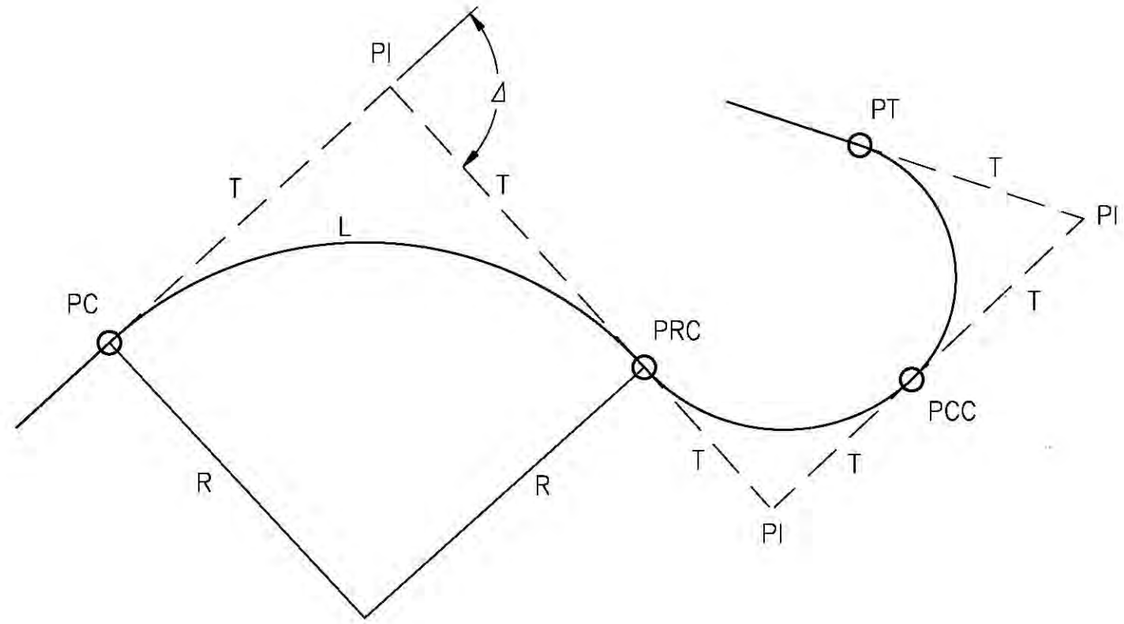
FIGURE 19

DEFINITIONS OF PLAN AND PROFILE TERMS

HORIZONTAL CURVES

Horizontal Curve – A curve shown in the plan view.

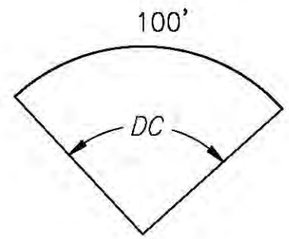
PC	Point of Curvature; beginning point of a horizontal curve.
PT	Point of Tangency; end point of a horizontal curve.
PI	Point of Intersection; the point at which two tangents to curve intersect.
T	Tangent; the distance from the PI to the PC or the PT (the distance between the PT of a curve and the PC of the next curve is also known as the tangent, but is not to be confused with the curve tangent).
Δ	Delta or deflection; the angle between the tangents, which is equal to the angle at the center of the curve.
DC (D)	Degree of Curve; the angle whose arc or chord on the given radius equals 100 feet.
PCC	Point of Compound Curvature; a point where the PT of a curve equals the PC of the next curve in the same direction.
PRC	Point of Reverse Curvature; the point where the PT of a curve equals the PC of the next curve in the opposite direction.
L	Length of Curve; length of the circular curve from PC to PT measured along its arc.
R	Radius of curve.
AP	Angle Point

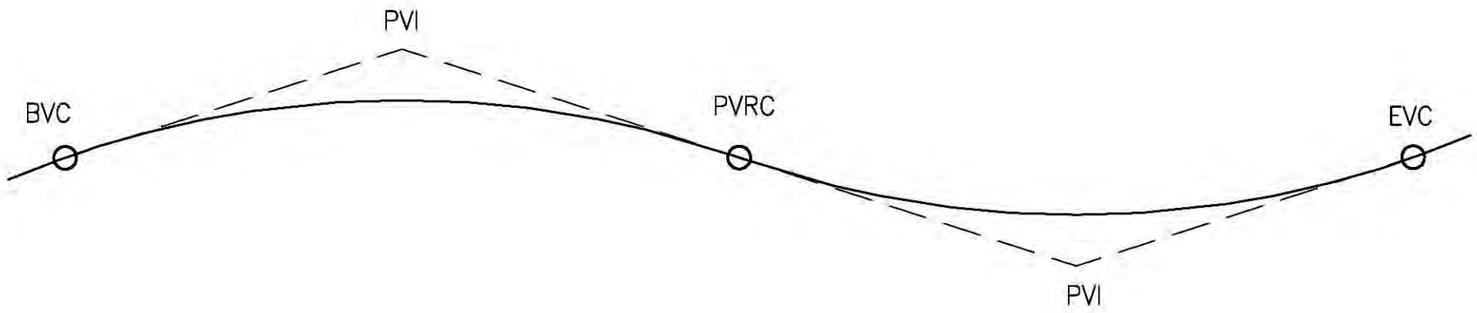


VERTICAL CURVES

Vertical Curve – A curve shown in the profile view.

BVC	Beginning of vertical curve.
EVC	End of vertical curve.
PVI	Point of Vertical Intersection; the point at which the tangents intersect.
PVCC	Point of Vertical Compound Curvature; a point where the EVC of a curve equals the BVC of the next curve in the same direction.
PVRC	Point of Vertical Reverse Curvature; a point where the EVC of a curve equals the BVC of the next curve in the opposite direction.





ROADS AND RELATED SYMBOLS

For Project and All General use maps

- Primary
- Secondary
- Trail

Roads for Special purpose maps

- Paved
- Improved
- Unimproved
- Proposed
- R.G. & S. — Railroad *
- UNION PACIFIC — Railroad – Double track *
- Railroad – In Street or Road *
- Bridge
- Culvert
- Tunnel
- 6 / STATE HWY. 6 — State Highway System
- 85 / U.S. 85 — U.S. Highway System
- 70 / I–70 — Interstate Highway

* Place on the name or the initials of the railroad on the drawing. Do not use the word railroad or railway.

COMMUNICATIONS AND UTILITIES

- Telephone Line
- Transmission Line
- Power and Phone Combined
- Pipe Line
- General Fence
- Barbed Wire Fence
- Chain Link Fence with Barbed Wire
- Buried Water Line
- Buried Sewer Line
- Buried Gas Line
- Buried Fiber Optic Line
- Buried Electrical Line
- Buried Phone Line
- Buried Telemetry

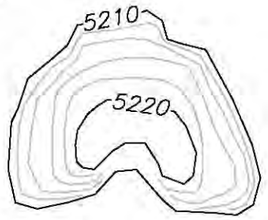
DRAINAGE AND PERTINENT WORKS

- River (Show waterline if sufficient offset)
- River Bank (Use only when contours confuse or define river bank)
- Streams
- Intermittent streams
- Drain or Wasteway Channel
- Spring
- Dams
- 10 — Gauging Station
- Reservoir or Lake
- Reservoir Site
- Marsh or Swamp
- Lined Canal
- Canal
- Proposed Canal
- Flume
- Siphon
- Tunnel

BOUNDARIES, MARKS, AND MONUMENTS

- Bench Mark
- U.S. Land Survey Corner found in field (describe)
- Triangulation Station
- Calculated Survey Corner (Used with Coord System Only)
- International Boundary
- State Line
- County Line
- Reservation Line
- Land Grant Line
- City Boundary
- Township Line
- Section Line
- Boundary Monument
- Basin Boundary or Right of Way

TOPOGRAPHIC RELIEF



Index contours are heavy weight and labeled with the elevation.
Text height should be .10".
Intermediate contours are light weight and are not labeled unless the contour interval is irregular.
Break intermediate contours if the area is congested.

- Depression Contour
- Rock Outcrop
- Edge of Trees and Shrubbery
- Trees or Orchard
- Clumps of Willows, Trees or Brush
- Meadow or Grass
- Sand Dunes or Desert

E 2,000,000
N 1,000,000

State Plane Coordinate tick placement is dependent on the scale of the drawing.
Drawing scale X (times) 5 = distance between ticks (e.g. 1"=20' 20'X5=250') or ticks every 250'. Label the coordinates along the top and left side of the drawing.
Symbol and lettering should be light weight.
Lettering should have a text height of .1" , vertical font and should be placed 1/8" from the edge of the symbol.
The symbol size is 1/2 " x 1/2".

MISCELLANEOUS SYMBOLS

- Town
- Principal City
- Capital City
- Buildings (General)
- Town, City Village (Generalized)
- Detailed Street Layout
- Church
- School
- Wind Mill
- Well
- Saw Mill
- Airport
- Cemetery
- Mine, Quarry or Gravel Pit
- Shaft
- Camp Ground
- Corral
- Drill Hole or Auger Hole
- Test Pit

GENERAL MAPPING SYMBOLS

HYDROLOGIC MAP SYMBOLS

RECORDING	RECORDING AND NON–RECORDING	NON–RECORDING	
●	◐	○	Precipitation Station
		◍	Precipitation Storage
●—	◐—	○—	Precipitation & Temperature
●	◐	○	Precipitation & Evaporation
●—	◐—	○—	Precipitation, Temperature & Evaporation
⊕	⊕	⊕	Complete Meteorological Station
		◇	Snow Survey Course
▲		△	River Gauge, Rated
▨		□	River Gauge, Stage Only
◧		◫	Reservoir or Lake Gauge

- Chemical quality analysis alone or at river or lake gauges, e.g., ◣, ◫.
- Sediment load sampling alone or at river or lake gauges, e.g., ▲, ⊓.
- Sanitary quality analysis alone or at river or lake gauges, e.g., ◢, ◫.
- Sanitary quality analysis involving discharge measurements where there is no gauge or at unrated gauge, e.g., ◻.
- Used in combination with complete meteorological station symbols to indicate radar equipment.
- Used in combination with other symbols as ϟ to indicate telephonic or remote wired recorder.
- Used in combination with other symbols as ●ϟ to indicate radio equipped gauge.
- Station in operation only a portion of the year as ▲* .

DRAINAGE MAP SYMBOLS

- Canal or Lateral
- Proposed Canal
- MH # — Manhole
- Pipe Relief or Interceptor Drain
- Pipe Collector Drain
- Proposed Pipe Relief or Interceptor Drain
- Proposed Pipe Collector Drain
- Open Subsurface Drain
- Proposed Open Subsurface Drain
- Open Surface Drain
- Proposed Open Surface Drain
- Natural Drain
- Suboutlet (Creek)
- Outlet (River)

Limit of Groundwater Investigation

Ground–Surface Contour — 1820

Other Contours (Solid contours can be used when surface contour does not appear on same drawing.) — 4225

PROPOSED	COMPLETED	
○	●	Cased Hole
⊖	⊕	Uncased Hole
□	■	Test Pit
◎	◉	Irrigation Well

PROPOSED	COMPLETED	
△	▲	Drainage Well
◫	◫	Other Wells (Use letter to designate type)
◈	◈	On Line Pumping Plant

All wells, holes and test pits should have identification number.

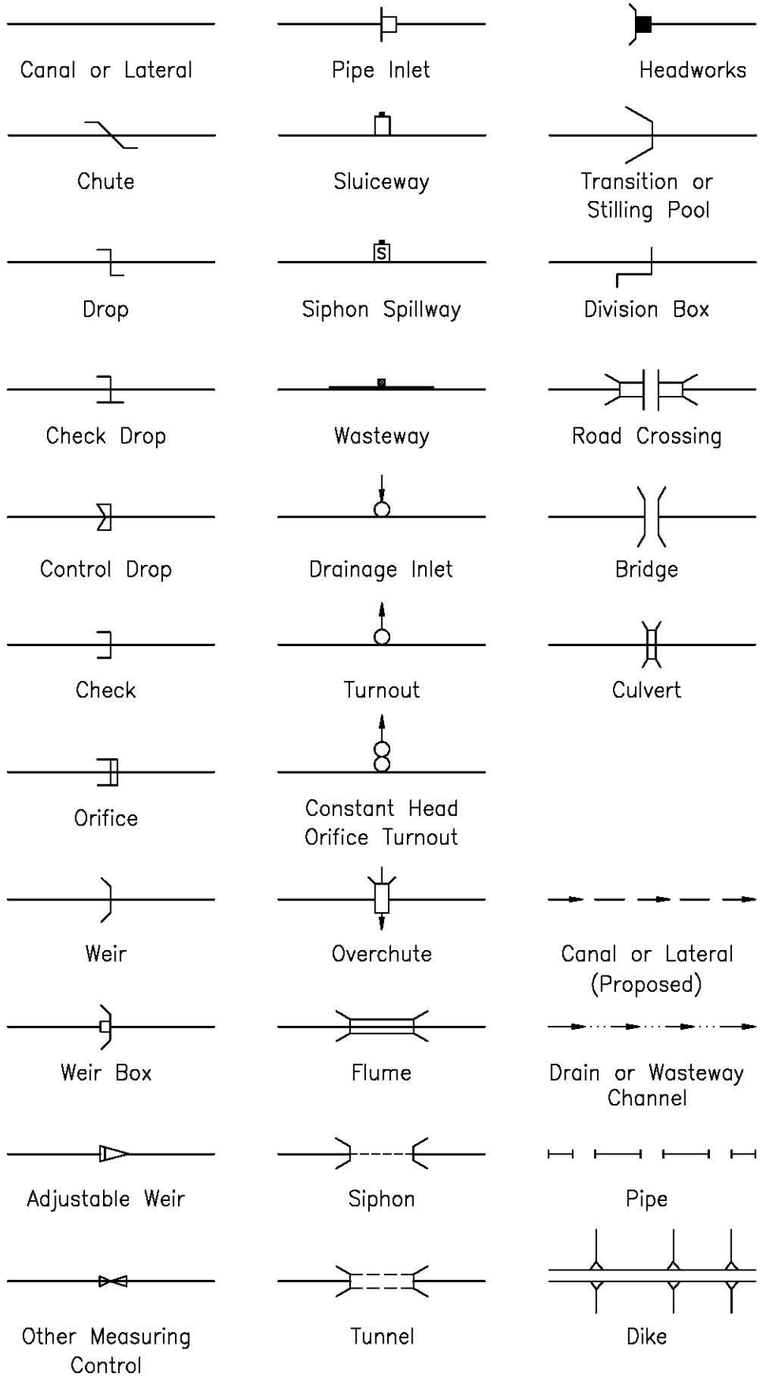
SYMBOLS AND CORRESPONDING COLORS FOR GROUNDWATER OR BARRIER DEPTH

Red	First Interval Below Ground Surface
Blue	Second Interval Below Ground Surface
Orange	Third Interval Below Ground Surface
Green	Fourth Interval Below Ground Surface
No Color	Depth Greater Than Last Interval Used

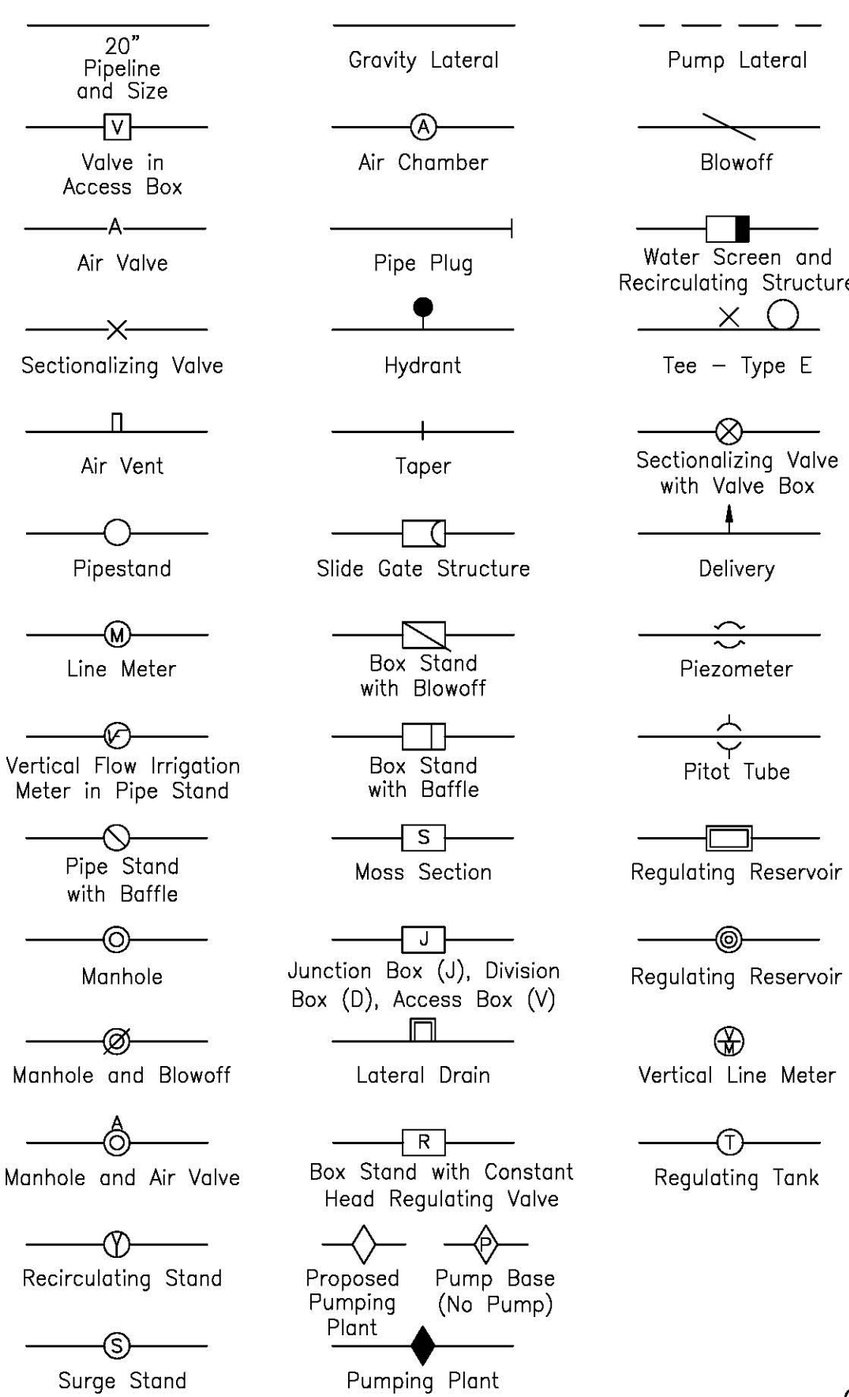
The depths for each interval should be shown on all maps.

HYDROLOGIC MAP AND DRAINAGE MAP SYMBOLS

CANAL DISTRIBUTION SYSTEMS



PIPELINE DISTRIBUTION SYSTEMS



CANAL AND PIPELINE DISTRIBUTION SYSTEMS SYMBOLS

2009–03–09

FIGURE 23

UNITED STATES GOVERNMENT POWERPLANTS AND PUBLIC POWERPLANTS (NON FEDERAL)

See notes for Government owned plants other than the Bureau of Reclamation

TYPE OF PLANT	EXISTING	AUTHORIZED	POTENTIAL
HYDRO	■	◪	□
STEAM	●	◕	○
DIESEL	▼	▼	▽

PRIVATE POWERPLANTS

TYPE OF PLANT	EXISTING	AUTHORIZED	POTENTIAL
HYDRO	■	◪	□
STEAM	●	◕	○
DIESEL	▼	▼	▽

SUBSTATIONS

	EXISTING	AUTHORIZED	POTENTIAL
FEDERAL	▲	▲	△
PUBLIC (NON FEDERAL)	▲	▲	△
PRIVATE	▲	◮	△

TRANSMISSION LINES

	EXISTING	AUTHORIZED	POTENTIAL
FEDERAL	115 kv.	115 kv.	115 kv.
PUBLIC (NON FEDERAL)	115 kv.	115 kv.	115 kv.
PRIVATE			

INTERCONNECTION

OTHER ——|——|—— FEDERAL

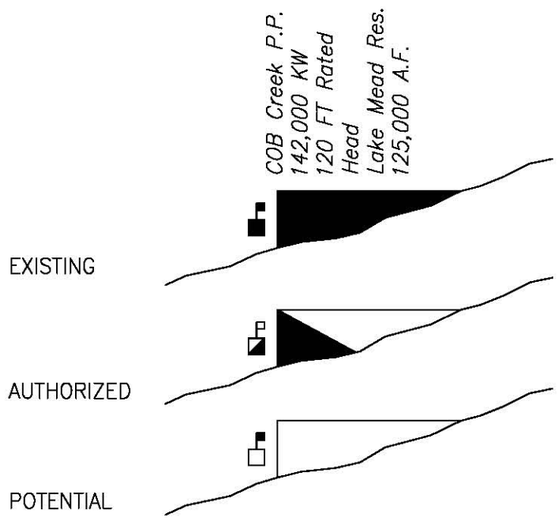
COMMUNICATION LINES

TELEPHONE LINE

TELEGRAPH LINE

TELEPHONE AND TRANSMISSION LINE JOINT CONSTRUCTION

RESERVOIR PROFILES



NOTES

General maps for development shall be prepared at a scale of either 1:500,000, 1:1,000,000, or 1:2,500,000. Detail maps are to be of adequate scale. All maps should show state and county boundaries, principal cities and important towns, all important rivers, lakes and reservoirs and such other appropriate data necessary to its particular use.

All Government owned transmission lines shall be represented by heavy weight lines and all other nonfederal systems shall be represented by medium weight lines.

Government owned plants and transmission lines other than the Bureau of Reclamation shall be specifically identified by the following mark * and the name of the agency adjacent to the symbol.

For multicolored maps, for special purposes, the color standards used should conform to those specified in the instructions governing the map to be prepared, see Appendix D for standard colors.

To facilitate mapping of progressive development, the short dashed lines indicating potential should be of such length that two short dashes plus one space will equal one long dash thus advancing from potential to authorized by filling in every other space.

The line voltage in kilovolts should be indicated along the line and at all points of change of voltage indicate the standard voltage rating as follows: 2.3–6.9–13.8–23–34.5–46–69–115–138–161–196–230–345kv.

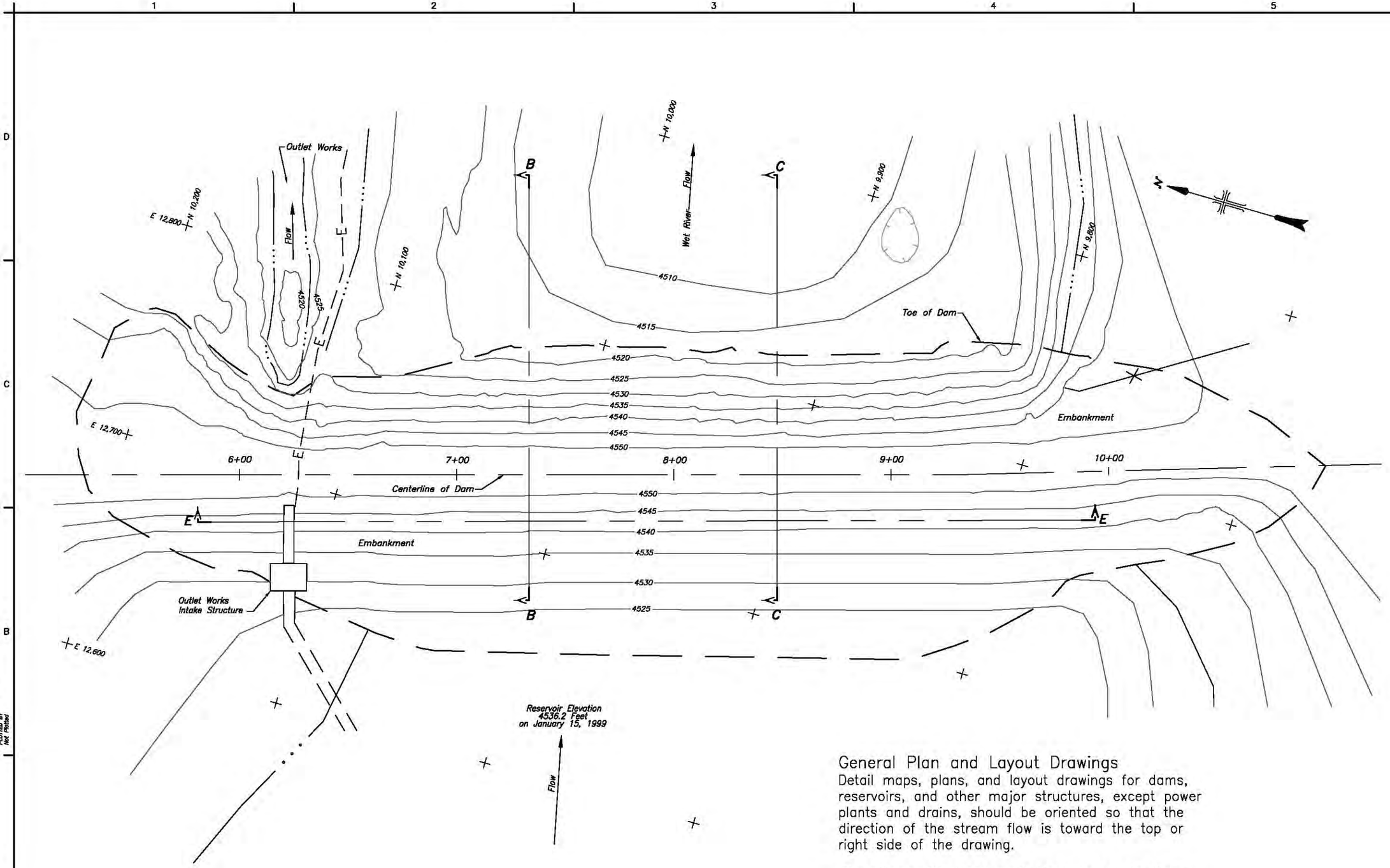
Where two numerals are used on the same line viz: 46/115 the first number indicates the operating voltage, the second number indicates the insulated or design voltage.

All powerplants and substations shall be identified either by name or number with accompanying estimated ultimate capacities in kilowatts. If numbers are used a reference table showing identification number, the name and estimated ultimate capacities in kilowatts shall be shown on the map.

Where the town and powerplants have the same name, show separately the location and name both the town and powerplant. Locate the powerplant by point of contact of the proper symbol with the stream.

Profile maps should show the stream, reservoir and powerplant locations, powerplant name, capacity in kilowatts, rated head in feet and reservoir name and capacity in acre feet.

POWERPLANT AND TRANSMISSION LINE SYMBOLS



General Plan and Layout Drawings

Detail maps, plans, and layout drawings for dams, reservoirs, and other major structures, except power plants and drains, should be oriented so that the direction of the stream flow is toward the top or right side of the drawing.

Elevations, Vertical and Horizontal Sections

All sections and elevations paralleling the direction of stream flow should be drawn with the direction of flow from left to right. Except for power plants, vertical sections and elevations normal to the direction of flow of a stream or canal should be looking downstream.

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BUREAU OF RECLAMATION
STANDARD DRAWING
MONTANA

DRAFTING STANDARDS

DIRECTION OF STREAM FLOW

DESIGNED
DRAWN
CHECKED
TECH. APPR. NAME, PROF. ABBR.
ADMIN. APPROVAL
NAME
TITLE
BILLINGS, MONTANA YYYY-MM-DD

GENERAL PLAN AND LAYOUT DRAWINGS

PRJ-STA-SEQ

SHEET 1 OF 1

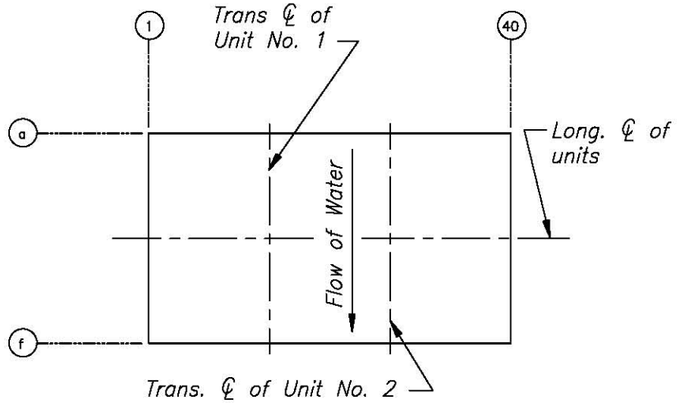
DATE AND TIME PLOTTED
Not Plotted
PLOTTED BY
Not Plotted

CAD SYSTEM
AUTOCAD
CAD FILENAME
UNKNOWN

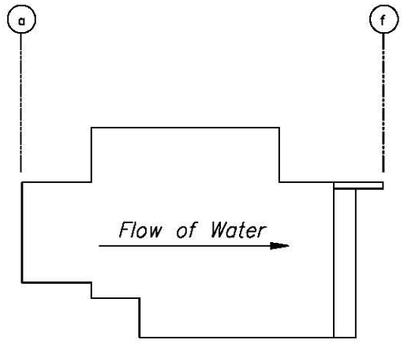
2011-01-25

FIGURE 25

ORIENTATION FOR POWERPLANT DRAWINGS

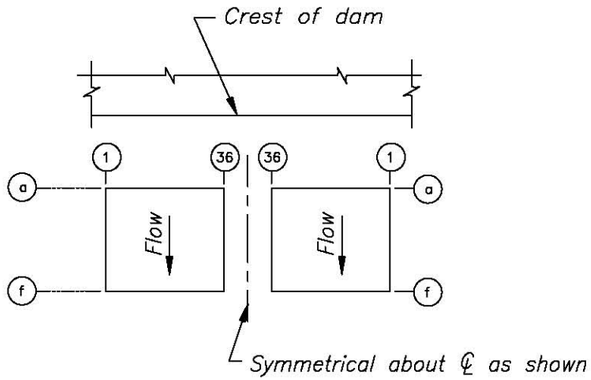


TYPICAL PLAN

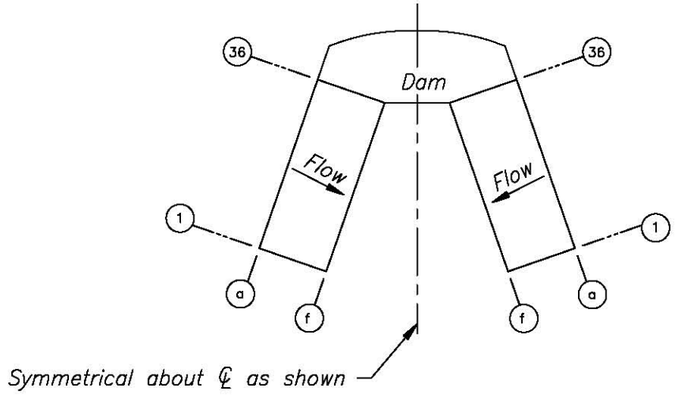


TYPICAL ELEVATION OR SECTION

ORIENTATION FOR IRRIGATION DRAINS



GENERAL CASE



SPECIAL SYMMETRICAL CASES

On powerplant work, orient all major plans and sectional elevations so that flow of water through the building will be from either the top or the left side of the drawing with the exception of the following elevations:

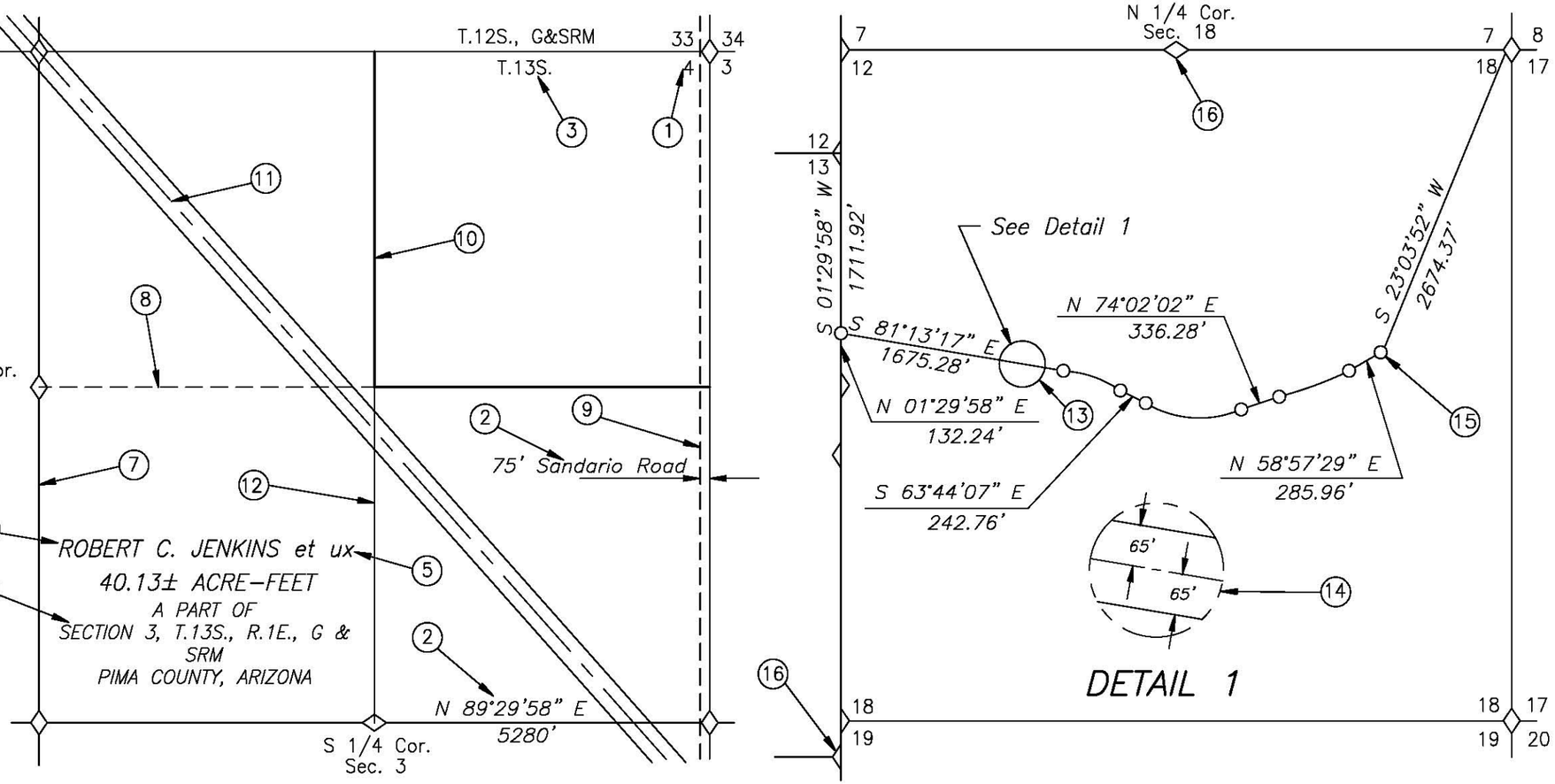
1. Two adjacent walls at an expansion joint.
2. Left end wall of building.
3. Tailrace wall (viewed from gallery side).

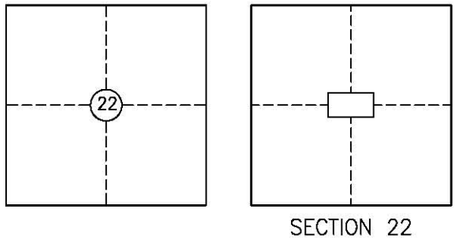
In general, reference line letters or numbers should read from left to right or top to bottom.

Numbering of units should follow the same order as the numbering of reference lines.

Pumping–generating plants shall be oriented similarly to powerplants.

STREAM FLOW – ORIENTATION AND DIRECTION FOR POWERPLANTS AND IRRIGATION DRAINS

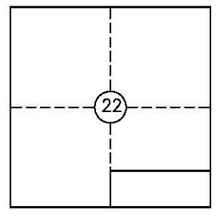




SECTION 22

SECTION NUMBER

The "Key Map" indicates the section with a circled number, place in center. If a land parcel lies in this area, it is acceptable to place the number below the key map as shown on the example above right. Upper case lettering, 0.100" high light lineweight.



OWNERSHIP

In an effort to avoid unnecessary clutter and duplication, keep ownership lines in the key map whenever possible. See example above.

STANDARD TEXT SIZES, LINE WORK AND SYMBOLS

(1) Labeling of section corners and quarter corners is 0.100" high, vertical, upper and lower case, light lineweight (.010"/.25mm).

(2) Notes, bearings and distances are 0.10" high, sloped, upper and lower case, light lineweight (.010"/.25mm). Show bearing labels above and distances labels below the line they call out.

(3) Township and range information are 0.100" high, vertical, uppercase light lineweight (.010"/.25mm).

(4) Owner name is 0.120" high, sloped, upper case, medium lineweight (.014"/.35mm).

(5) The terms "et ux" (and spouse) and "et al" (and others) are 0.120" high, sloped, lower case, medium lineweight (.014"/.35mm).

(6) Location information is 0.100" high, sloped, upper case, light lineweight (.010"/.025mm).

(7) Section lines should be medium weight (.014"/.35mm).

(8) Quarter section lines should be light weight (010"/.25mm).

(9) Lines to indicate a road should be medium weight (.014"/.35mm).

(10) The take line should be heavy weight (.020"/.50mm).

(11) Centerlines should be light weight (.010"/.25mm).

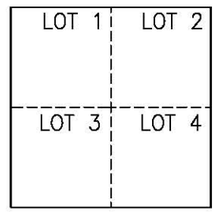
(12) Lines showing ownership should be medium weight (.014"/.35mm).

(13) Small circle surrounding area to be enlarged is approximately 1/4", (can vary in diameter). Text is 0.120" high, light lineweight (.010"/.25mm).

(14) Large circle used to show detail is a minimum of 1" in diameter. Text is 0.080" high, light lineweight (.010"/.25mm).

(15) Circles showing points are 3/32".

(16) Diamonds indicate found corners and are 1/8" x 3/16". One half diamonds indicate offset sections.



LOT

Lot labels are 0.100" high, upper case, light lineweight. Lot numbers – should be numerals (not spelled out). Unless otherwise specified, place "LOT" in the upper right hand corner.

Layer – G–ANNO–TEXT–175~
Color – 7
Font – LEROY
Oblique angle – 15
Height – .175

A

A'

S 35° W

Layer – B–PROF–DIMS
Color – 1
Font – LEROY
Oblique angle – 15
Height – .12

Layer – B–PROF–TEXT–100~
Color – 1
Font – VLEROY
Oblique angle – 0
Height – .10

(Elevation, centerline and rotation of text optional)

INTERSECTION SECTION B–B

Layer – B–PROF–TEXT–100~
Color – 1
Font – LEROY
Oblique angle – 15
Height – .10

DH–166
El. 6950
(proj. 27' NE)

Layer – B–PROF–TEXT–120~
Color – 3
Font – LEROY
Oblique angle – 15
Height – .12

AP–200
El. 6920
(proj. 100' SW)

Layer B–PROF–OGRD
Color – 3
Linetype – CONTINUOUS

DH–240
El. 6723.7
(bearing N10°E)

Original ground surface

DH–166

SAND

60.8

Qal

LEAN CLAY

21.4

SAND

Qal

ELEVATION IN FEET

Layer – B–PROF–TEXT–100~
Color – 1
Font – LEROY
Oblique angle – 15
Height – .10

.125

SANDSTONE

.1

.2

242.2

.125

Layer – B–PROF–TEXT–080~
Color – 11
Font – LEROY
Oblique angle – 15
Height – .080

PL

SS

GS

GC

Kd

120.0

178.1

255.0

T.D. 271.1

Layer PRDF–CONT–HIDD
Color – 5
Linetype – HIDDEN

75.0

0.0 – 70.0 SAND
70.0 – 182.2 SANDSTONE

(When too crowded, show down hole info. in table form)

Layer B–BORE–HOLE
Color – 1
Linetype – CONTINUOUS

SANDSTONE

158.0 WL 1990–09–23

(Water level on left when able – 90° cut)

Layer – B–PROF–DIMS
Color – 1
Linetype – CONTINUOUS

Layer – B–PROF–WLIN
Color – 1
Font – LEROY
Oblique angle – 15
Height – .080

T.D. 642.2

(Use only if total depth of hole will not fit on section – 45° Cut)

.4

.2

Layer PRDF–FALT–HIDD
Color – 5
Linetype – FAULT

Kd

Kd

Layer – B–PROF–TEXT–140~
Color – 5
Font – VLEROY
Oblique angle – 0
Height – .14

F1

Layer – B–PROF–TEXT–100~
Color – 1
Block Name – G1–11

7100
7000
6900
6800
6700
6600
6500

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300

DISTANCE IN FEET

(DISTANCE IN FEET OR STATIONS IN FEET)

Layer – B–PROF–TEXT–100~
Color – 3
Font – LEROY
Oblique angle – 15
Height – .10

Layer – B–PROF–TEXT–175~
Color – 7
Font – LEROY
Oblique angle – 15
Height – .175

GEOLOGIC NOTE

For General Geologic Legend, Explanation and Notes, see Dwg. 344–330–0000.

Layer – B–PROF–TEXT–120~
Color – 3
Font – LEROY
Oblique angle – 15
Height – .12

DATE AND TIME PLOTTED
Not Plotted
PLOTTED BY
Not Plotted

CAD SYSTEM
AUTOCAD
CAD FILENAME
UNKNOWN

2011–01–25

RECLAMATION
Managing Water in the West

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

STANDARD DRAWING
MONTANA

DRAFTING STANDARDS

GEOLOGIC DRAFTING DETAILS

DESIGNED
DRAWN
CHECKED
TECH. APPR. NAME, PROF. ABBR.
ADMIN. APPROVAL
NAME
TITLE
BILLINGS, MONTANA YYYY–MM–DD

GEOLOGIC CROSS SECTION

PRJ–STA–SEQ

SHEET 1 OF 1

FIGURE 28

GEOLOGIC EXPLORATION OR MINING

5'x 7' ◪ 37 — Exploration or mine shaft (approximate depth and size.).

or — Exploration tunnel (dashed if projected on surface map or projected to sections, solid if on elevation plan map or along section.)

Drift No. A / or / Raise 48 — Exploration adit, drift, raise or winze (dashed if projected, solid if on elevation plan map or section).

130' / 5'x 6' — Mine adit (approximate length and size).

Open pit, quarry or mineral prospect pit.

Sand, gravel pit.

GEOPHYSICAL DATA POINTS

10 — Resistivity sounding

11 — Resistivity sounding with spread direction

R-9 — Seismic shot point

R-10 — Seismic shot point with spread direction

R-11 — Seismic shot point with spread direction and geophone locations.

GR-26 — Other geophysical data points –– use the symbol and suffix GR for gravity, MG for magnetometer.

EXAMPLES OF SYMBOLS FOR SPECIAL TESTS

$R4B_2$ — Radial Jacking Test

$U4B_2$ — Uniaxial Jacking Test

GJ — Plate Jack Test

SR — Stress Relief Test

IS — In Situ Shear Test

SPECIAL PURPOSE SYMBOLS AND SUFFIXES FOR EXPLORATION HOLES

To emphasize or call visual attention on a drawing to special type of drilling or sampling, measurements (repeated water level readings), logging methods (gamma, resistivity logs) for completed work: ●

(a) Use the standard solid circle symbol supplemented with other markings of their choice, which will provide the desired visual emphasis on that particular map such as ● ◉ ■

(b) Use the standard solid circle with an appropriate prefix or suffix to the drill hole number such as; PR–106 for penetration resistance.

SUFFIX AND PREFIX SYMBOLS

DH Drill hole
SPT or PR Penetration Resistance
CP Cone Penetrometer
VT Vane Test Hole
CS Clam Shell
DC Dutch Cone
PT Pitcher
DN Denison
GP Geophysical
CH Churn Drill
OW Observation Well
PZ Piezometer

Examples:
DH–103 (PR)
DN–103
PR–103 or SPT–197
DH–103–BS2

(C) Combine methods "a" and "b"

In every case the special symbol (and suffix) must be shown and adequately defined in the General Geologic Explanation, Legend and Notes Drawing

DRILL HOLE AND TEST PIT SYMBOLS

SURFACE GEOLOGY OR LOCATION OF EXPLORATION

DH–115 ● or DH–115 88 ● — VERTICAL DRILL HOLE. Dip may be useful if hole is assumed vertical but survey data indicates deflection.

44 / or / DH–62 44 — HORIZONTAL AND INCLINED DRILL HOLE. Bearing, projected length, and average angle from horizontal (U indicates up) are shown. Single or double line for trace of hole depends on scale of drawing.

● AP–201 — Auger hole (Prefixes: AP=Power Auger, AH=Hand Auger)

■ TP–301–SC — Test pit (backhoe, bulldozer, hand dug) Suffix may designate feature explored.

ELEVATION PLAN MAPS

DH–292 90 ○ — VERTICAL SURFACE DRILL HOLE. Solid black circle indicates that hole penetrates elevation of plan isopach, structural or bedrock contour maps; open circle indicates that it does not.

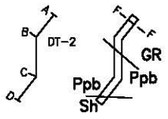
DH–148 / or / 37 37 — INCLINED SURFACE DRILL HOLE. Bearing projected length, and average angle from horizontal (U indicates up) are shown. Open circle indicates collar of hole; solid black circle indicates where hole intersects elevation of plan, isopach of contour maps; short dashes above, long dashes below.

DH–4–2 90 — VERTICAL UNDERGROUND DRILL HOLE. Collared at invert of tunnel or drift. Also solid black where penetrates a lower elevation.

DH–4–37 37 — INCLINED UNDERGROUND DRILL HOLE. Similar to inclined drill holes on surface maps.

DH–4–46 20 — HORIZONTAL UNDERGROUND DRILL HOLE. Usually collared near tunnel springline elevation. Includes same data as cross section drill holes.

TRENCH SYMBOLS



Exploration trench: show with single line if small–scaled drawing, or congested; or show width with or without major geological facts. Prefix DT indicates dozer trench, BHT indicates backhoe trench. Letters indicate stationing.

SYMBOLS FOR WORKING OR PROGRESS DRAWINGS

◐ DH–103 — Drilling in progress

○ DH–104 — Proposed drill hole

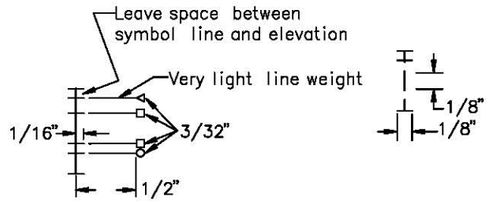
○ AP–203 — Proposed auger hole

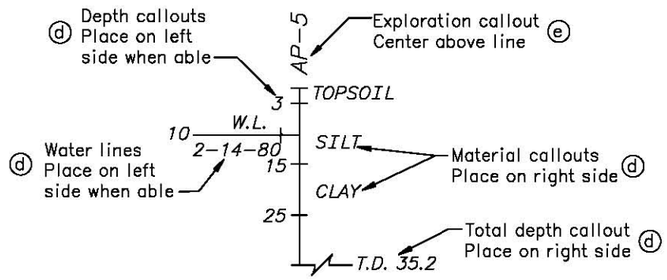
□ TP–205 — Proposed test pit

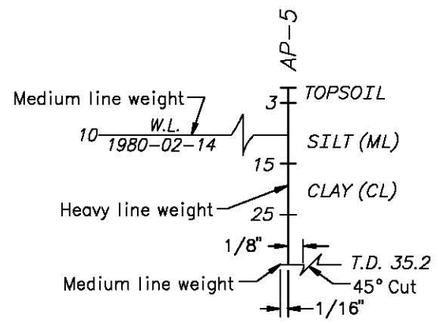
or DT–301 — Proposed trench

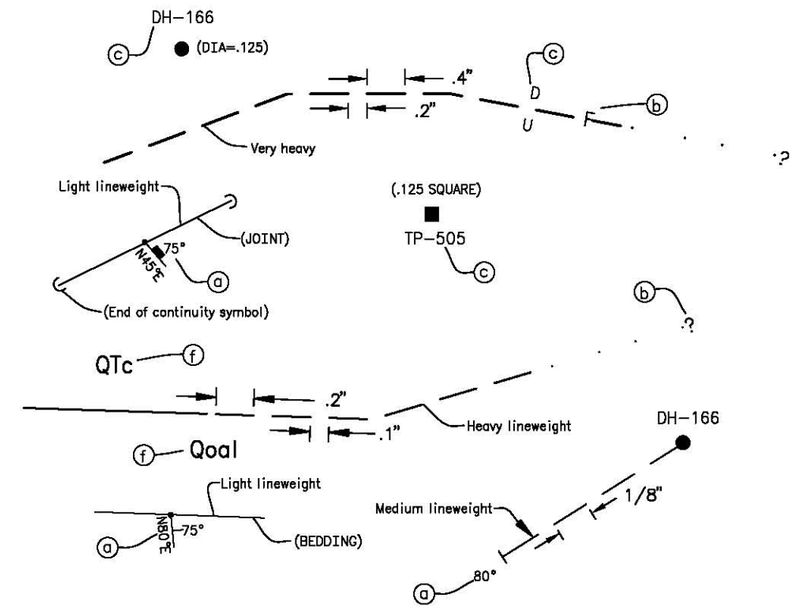
STRUCTURAL CONTOUR/ EXCAVATION GEOLOGY MAPS

Drill hole symbols used for vertical, horizontal, or inclined surface and underground holes are similar to ELEVATION PLAN MAPS except black circle indicates where hole penetrates excavation surface or structure. Short dashes above, long dashes below. Undergound holes that do not penetrate excavation or structure generally are not shown.









STANDARD LETTERING SIZES AND LINE WEIGHTS

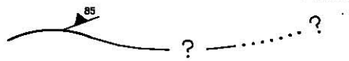
REF	LETTERING HEIGHT (INCHES)	LINEWEIGHT	VERTICAL/ SLANTED LETTERING
ⓐ	.080	Light	V
ⓑ	.120	Medium	V
ⓒ	.100	Medium	V
ⓓ	.080	Light	S
ⓔ	.100	Medium	S
ⓕ	.140	Heavy	V

LINEWEIGHT	INCHES	MM
Very Light	.007	.18
Light	.010	.25
Medium	.014	.35
Heavy	.020	.50
Very Heavy	.028	.70
Bold	.039	1.0

ALL LINES SMOOTH, BLACK, FIRM AND EVEN

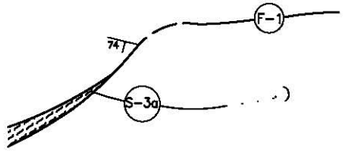
GEOLOGIC EXPLORATION AND TESTING AND SURFACE GEOLOGY SYMBOLS

CONTACTS



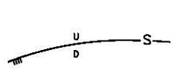
Solid where definite or located accurately (accuracy depends on survey control and scale of drawing); dashed where approximate; queried where inferred; dotted where concealed. Use appropriate attitude symbol for orientation of contact.

SHEARS AND FAULTS

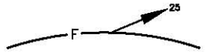


Shear and fault zones shown solid where definite or located accurately (accuracy depends on survey control and scale of drawing); dashed where approximate or projected; queried where inferred; dotted where concealed. Symbol) indicates probable limit of continuity. Letters "F" or "S" and number (F-1 or S-3a) used for identifying shears, faults, and their splays on drawings and references for discussion.

NOTE: Line weights for faults should be heavier than contacts, etc. Faults or shears can be lettered with "F" or "S" if needed to distinguish them from contours, contacts or other lines, especially when red overlays are not used.

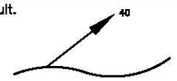


Shear showing relative vertical movement U, up and D, down. Hachures may be used on down side of normal shear or fault.



Fault, showing bearing and plunge of relative movement of downthrown (D) block

Thrust or reverse fault, barbs on side of upper plate



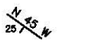
Fault, showing bearing and plunge of grooves, striations, or slickensides

Fault, showing relative horizontal movement

Strike and dip of fault or shear

Strike of vertical fault or shear, 90 degree dip must be shown

BEDDING



Strike and dip of beds

Horizontal beds

Strike of vertical beds

Apparent dip of bed

Approximate or estimated strike and dip

Strike and dip of overturned beds

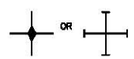
Cross bedding, strike and dip may be shown

Generalized strike and dip of crenulated or crumpled beds or foliation

FOLIATION OR CLEAVAGE

Strike and dip of foliation or cleavage

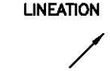
Strike of vertical foliation or cleavage



Horizontal foliation or cleavage

LINEATION

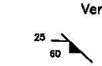
Bearing and plunge of lineation



Horizontal lineation

Vertical lineation

Strike and dip of beds and plunge of lineation



Strike and dip of foliation and plunge of lineation

JOINTS

Strike and dip of joint

Horizontal joint

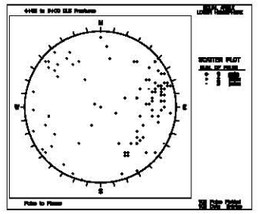
Strike of vertical joint

Strike and dip of multiple joints (Dip symbols shifted along strike for legibility; observations located at point of intersection.)

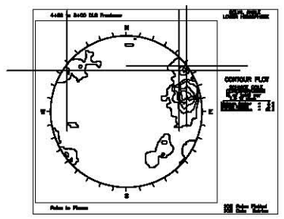
NOTE: Strike direction text may be omitted if clutter would result with its use.

Symbols with a dot indicate a surveyed location

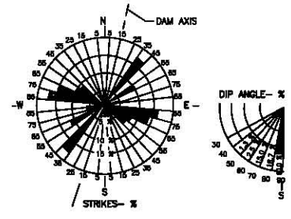
Symbols with no dot indicate a approximate location



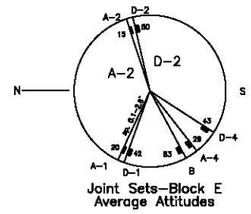
Point Contour Diagram: Poles plotted on lower hemisphere of equal area stereonet



Joint Contour Diagram: Poles plotted on lower hemisphere of equal area stereonet

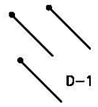


Joint Rose: Histogram presentation of joint strike or dips for a given joint sampling.



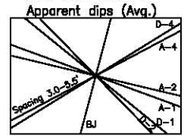
Joint Sets-Block E
Average Attitudes

Joint Set Diagram: Provides average attitudes of joint sets occurring in a specified area, such as a "foundation block", tunnel observation, abutment, or entire map. Spacing and/or percent of distribution from contour plotting may also be shown.



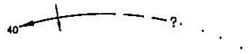
Apparent dip or joint traces on sections, or trench and tunnel logs.

Joint Sets-Block E
Apparent dips (Avg.)

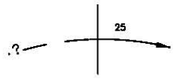


Apparent Dip Block: Illustrates average orientation of joint sets in plane of geologic section for a specific area, or along entire section. Spacing or percent distribution may be shown.

FOLDS

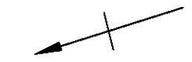


Anticline, showing trace of axial plane and bearing and plunge of axis, Dashed where projected or approximate; queried where inferred; dotted where concealed.



Syncline, showing trace of axial plane and bearing and plunge of axis. Dashed where projected or approximate; queried where inferred; dotted where concealed.

Overturned anticline, showing trace of axial plane, direction of dip of limbs and bearing and plunge of axis.



Monocline, showing trace and plunge of axis.

Overturned syncline, showing trace of axial plane and direction of dip of limbs and bearing and plunge of axis

MISCELLANEOUS SYMBOLS

LANDSLIDES

Strike and dip of failure plane

Scarp location approximate, queried where inferred

DIKES AND SILLS

Strike and dip dike or sill

Horizontal sill

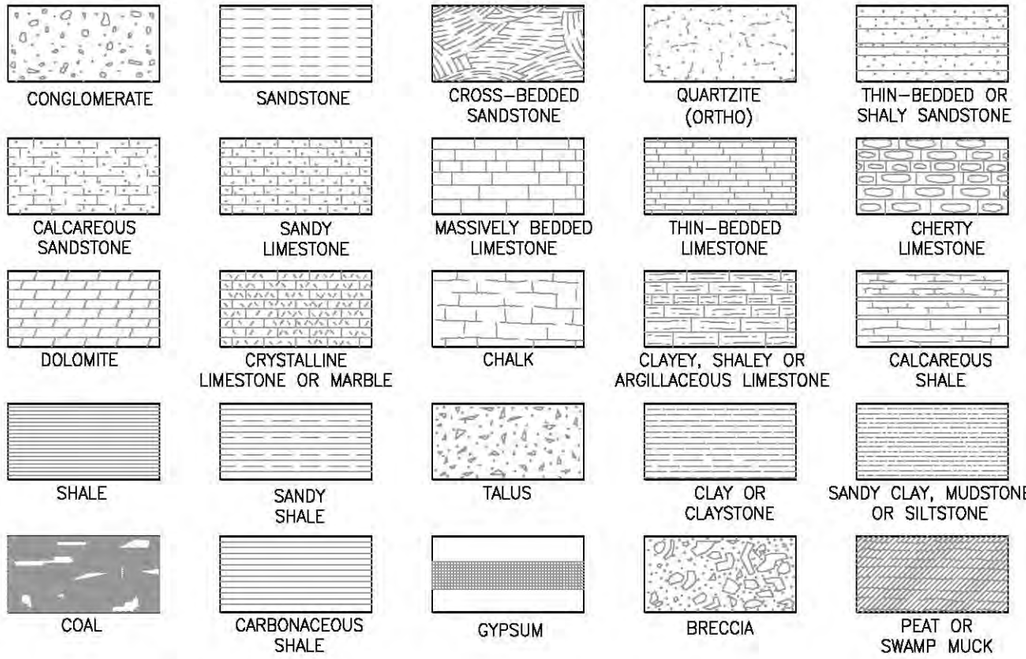
Strike of vertical dike or sill

OTHER SYMBOLS FOR PLANAR FEATURES

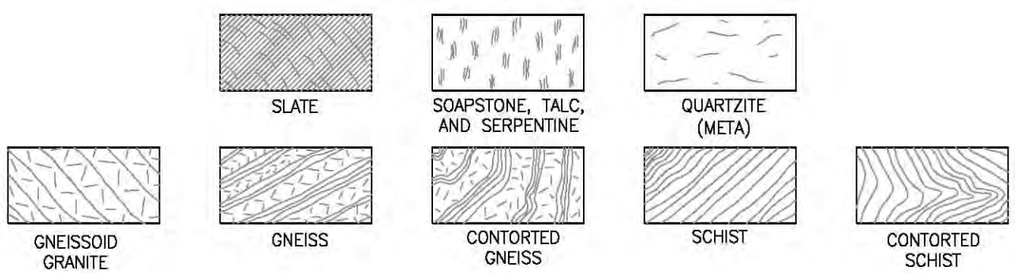
These symbols may be used for attitudes of veins or other structural features. They must be explained on the General Geologic Explanation, Legend and Notes Drawing.

GEOLOGIC FEATURE AND STRUCTURE SYMBOLS

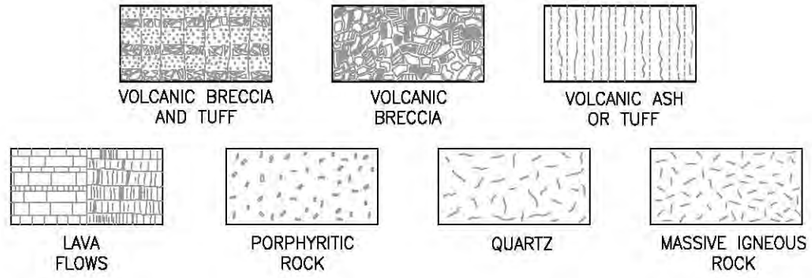
SEDIMENTARY ROCKS



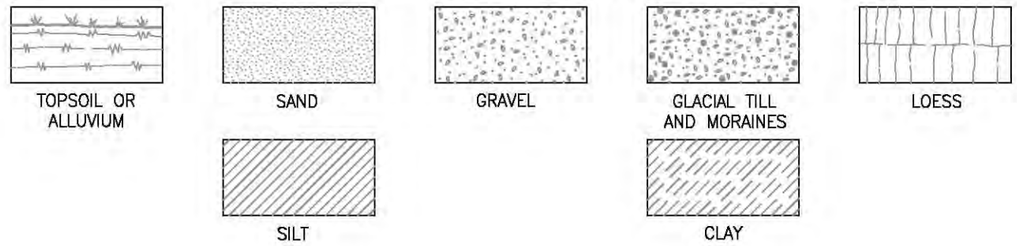
METAMORPHIC ROCKS



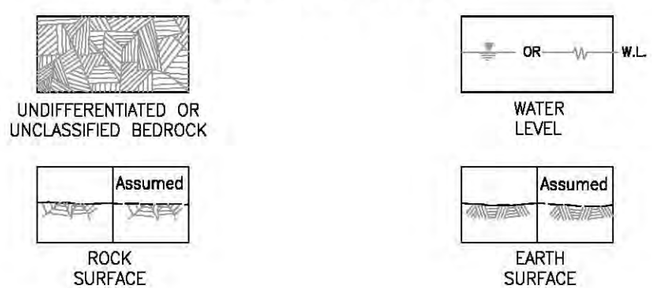
IGNEOUS AND PYROCLASTIC ROCKS



SURFICIAL MATERIALS

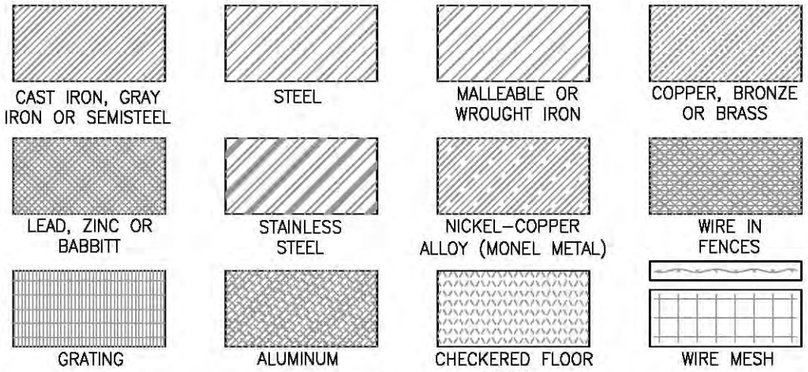


MISCELLANEOUS SYMBOLS

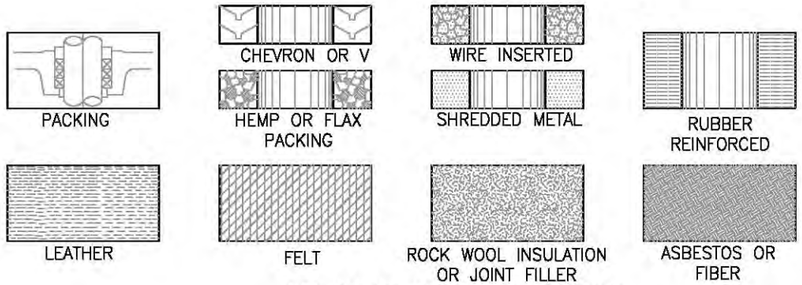


GEOLOGIC SECTION AND COLUMNAR SECTION SYMBOLS

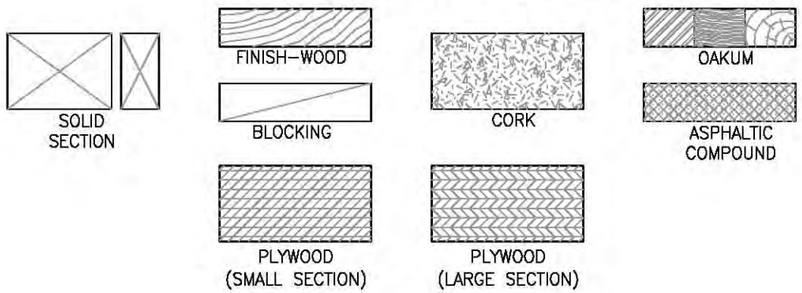
METAL SYMBOLS



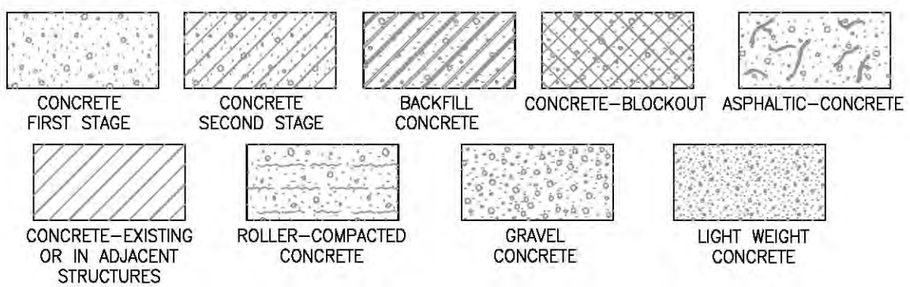
PACKING MATERIAL SYMBOLS

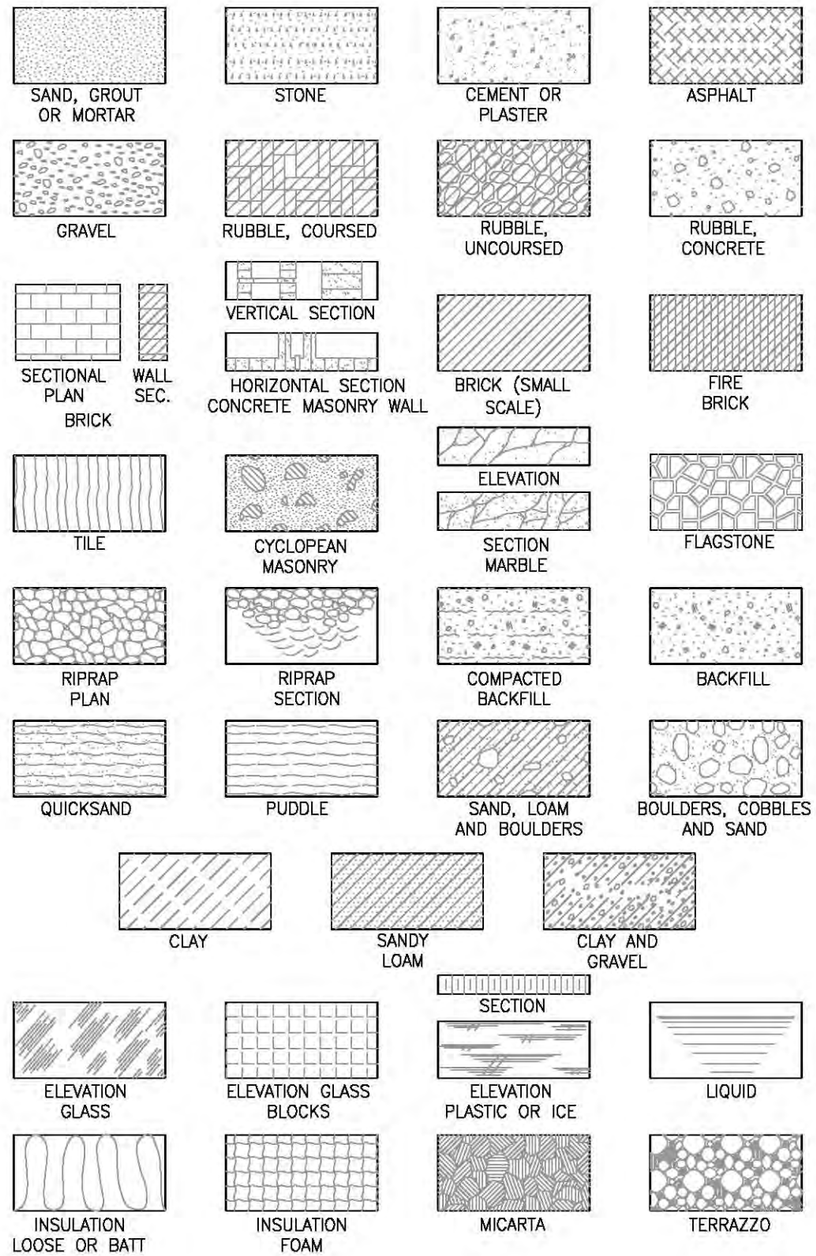


VARIOUS WOOD SYMBOLS

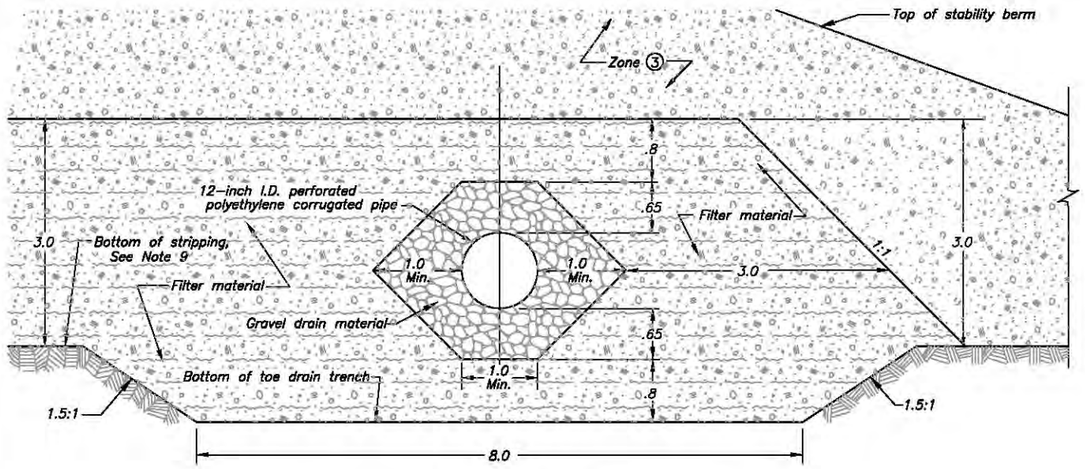


CONCRETE SYMBOLS

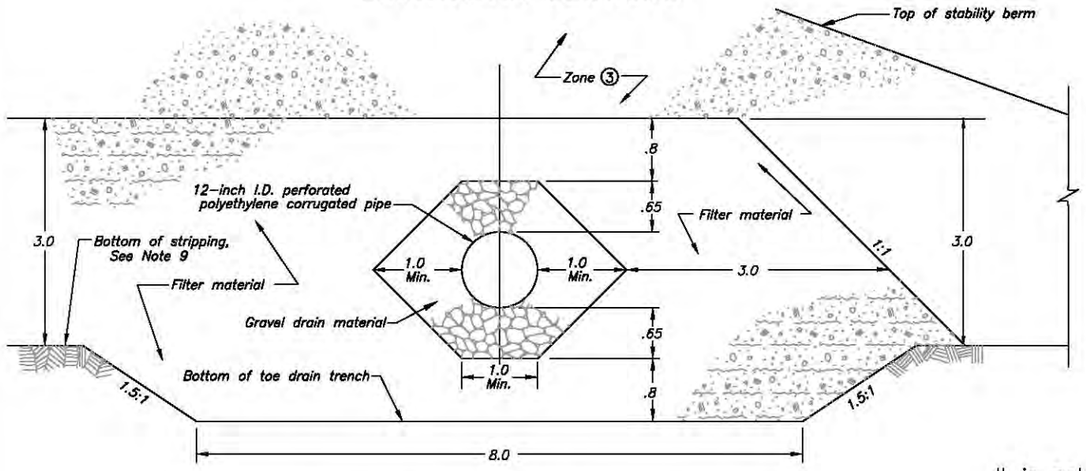




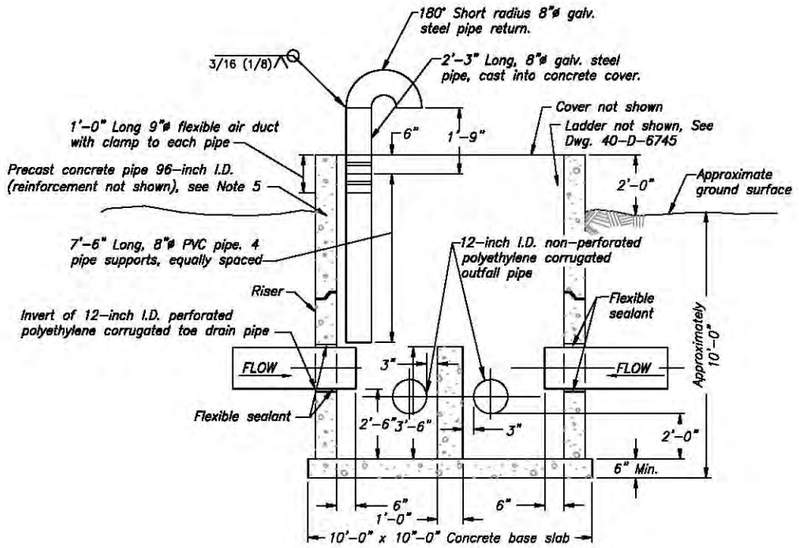
GENERAL MATERIAL SYMBOLS



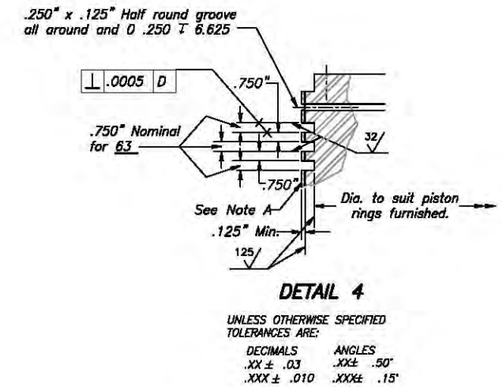
IMPROPER WAY OF SHOWING MATERIAL PLACEMENT IN EARTHWORK SECTIONS



PROPER WAY OF SHOWING MATERIAL PLACEMENT IN EARTHWORK SECTIONS



MATERIAL PLACEMENT IN STRUCTURES



MATERIAL PLACEMENT IN MACHINED PARTS

It is not necessary to show the material symbol throughout the entire section, only show the symbol in selected windows.

Keep the material symbol away from all dimensions, text, etc. Show the earth or rock symbol at all excavations.

The concrete symbol is used with reinforcement when cutting through a wall. Only when a window is cut to show reinforcement is the concrete symbol omitted.

All material symbols should be placed with a very light (.007"/.18mm) line weight and at a size proportionate to the scale of the drawing.

TYPICAL METHOD OF PLACING MATERIAL SYMBOLS

VALVES

- Gate valve
- Butterfly valve
- Ball valve
- Globe valve
- Needle valve
- Cone valve
- Quick opening valve
- Angle valve (Globe)
- Lock shield on valve
- Stop cock
- Three way plug
- Three way – Two port plug
- Four way
- Foot controlled valve
- Foot valve
- Check valve
- Angle check
- Pressure reducing valve (self contained)
- Pressure regulator (external control)
- Relief valve
- Air & Vacuum relief. For penstocks.
- Float trap. For air lines.
- Diaphragm valve
- Motor valve
- Solenoid valve
- 3 – Way solenoid valve
- 4 – Way – 3 position solenoid valve

EQUIPMENT

- Jet eductor
- Centrifugal pump
- Rotary pump
- Duplex strainer
- Single strainer
- Self cleaning strainer
- Moisture separator
- Heat exchanger
- Heat transfer coil
- Discharge to drain system
- Discharge to stream
- Hose connection
- Flexible pipe
- Orifice
- Open sprinkler head
- Fused sprinkler head
- Sprinkler directional spray

INSTRUMENTS

- Pressure gauge
- Duplex pressure gauge
- Recording pressure gauge
- Pressure switch
- Recording thermometer
- Thermostat
- Temperature sensing bulb
- Thermometer
- Flow sight
- Flow indicator (Vane or spinner)
- Rate of Flow indicator
- Flow detector. Open sight.
- Flow funnel
- Gage glass
- Float actuated level gauges
- Float operated switch

Instrument symbol with "S" indicates shutdown and alarms,
or with "A" indicates alarm only.

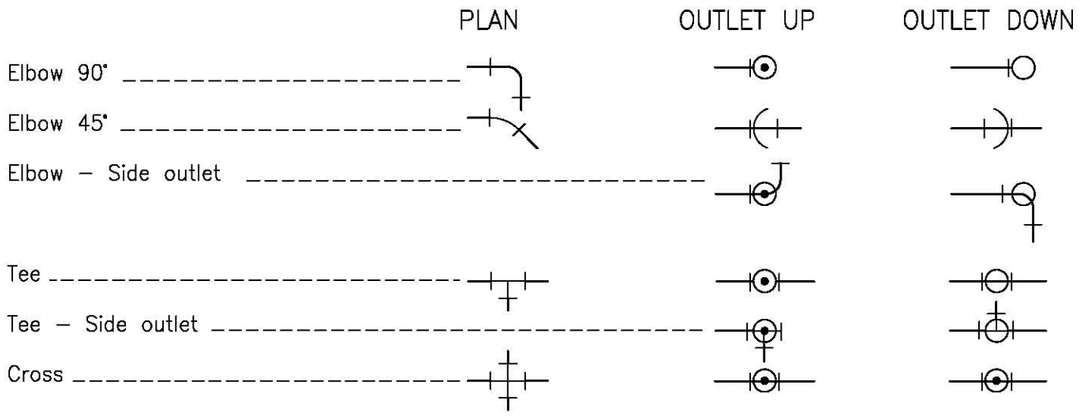
PIPING – SCHEMATIC DIAGRAM SYMBOLS

SINGLE LINE DRAWINGS

SCREWED PIPE AND FITTINGS

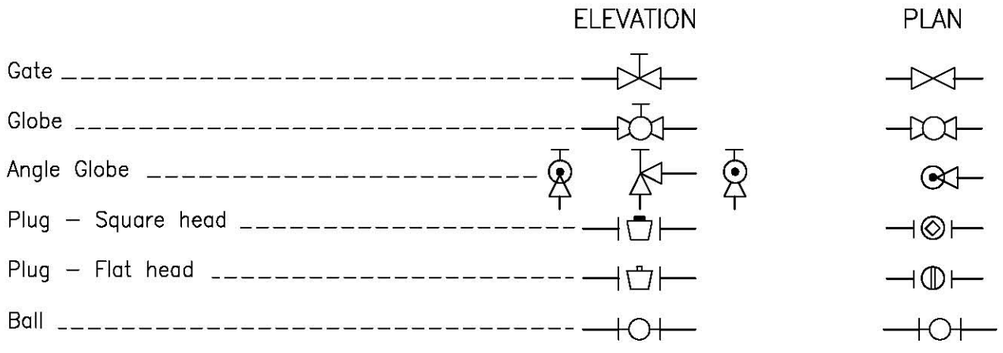
FITTINGS

All screwed piping is to be shown as single line, except large scale details.



VALVES

Show stem height to scale in appropriate view.



NOTES

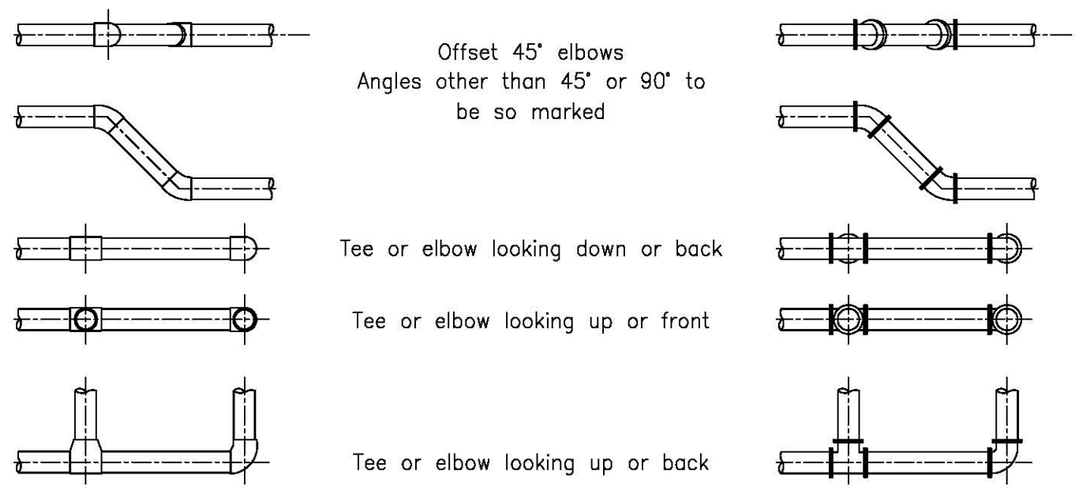
For SPECIAL VALVE AND INSTRUMENTS use schematic symbol to scale if possible Reference – Graphical Symbols American National Standard Institute Inc. Y32.4 – 1995.

For flanged, bell and spigot, welded and soldered joints also see American National Standards Institute Inc. standards.

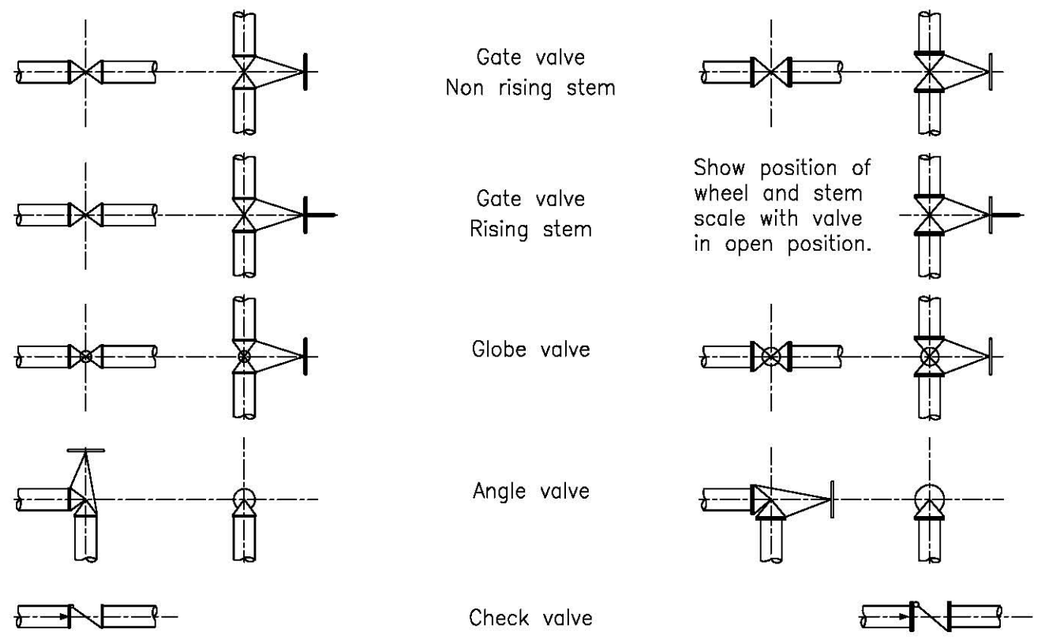
DOUBLE LINE DRAWINGS

Piping to be shown on drawings to scale by nominal pipe size and not by actual outside diameter, except on large scale detail drawings. Flanges should be shown to scale by actual diameter.

FITTINGS



VALVES

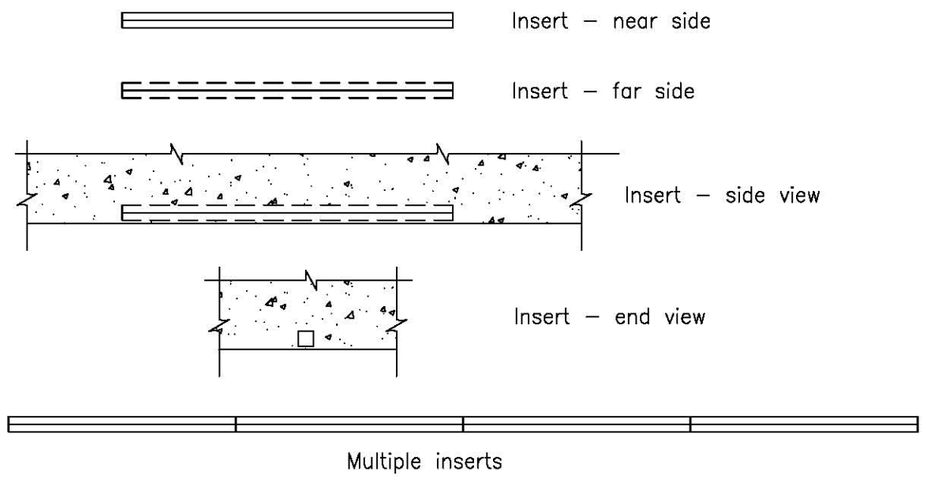


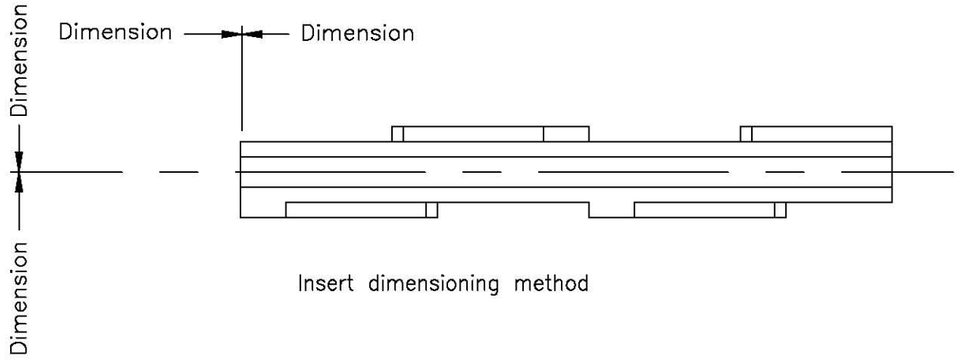
CONVENTIONS – SCREWED

CONVENTIONS – FLANGED

PIPING – SINGLE AND DOUBLE LINE SYMBOLS

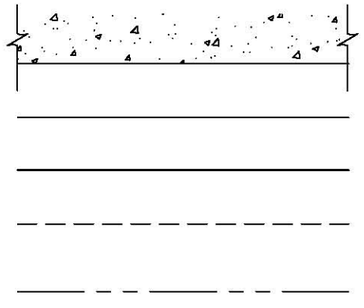
PIPE INSERTS





Insert dimensioning method

LINE SYMBOLS



MARKS

P1–P2.....etc. = Pipe and fittings
V1–V2.....etc = Valves
E1–E2.....etc. = Equipment, including pumps, strainers and miscellaneous items
H1–H2.....etc. = Hangers

The following note shall appear on detail drawings : "Marks appearing hereon shall be preceded by the drawing number of the sheet".

Example : 3354 – P3

BILLS OF MATERIAL

Bills of Material shall use the above marks preceded by the drawing number on which the pipe line, hanger or other equipment is detailed.

Bills of Material shall show the proper material specifications, and when the items are purchased, the procurement specification or invitation number shall be added.

Items shall be described and grouped on the Bills of Material according to material specifications, size, and kind, as near as possible, to the description required in the procurement specifications or invitations.

Bills of Material shall bear a separate drawing number from the piping detail drawing, and shall be referenced in the same manner as other Reference Drawings.

PIPE INSERTS, LINE SYMBOLS, MARKS, AND BILL OF MATERIAL

PIPE FITTINGS

Bell & spigot cast iron (ci)	Mechanical joint ductile iron (di)	Screwed	Flanged	Fitting type
				Reducing elbow
—	—			Tee
—	—			Reducing tee
—	—			Tee, outlet down
—	—			Tee, outlet up
				90° elbow
				45° elbow
		—	—	22 1/2° elbow
				Elbow up
				Elbow down
			—	45° wye
			—	45° wye up
		—	—	Combination y and one–eighth bend single
		—	—	Combination y and one–eighth bend single up
		—	—	Double 45° wye branch
		—	—	Double 45° wye branch up
		—	—	Combination y and one–eighth bend double
		—	—	Combination y and one–eighth bend double up

PIPE FITTINGS

Bell & spigot cast iron (ci)	Fitting type
	Sanitary tee with c/o
	Sanitary tee with c/o up
	Tee branch c/o with plug
	Tee branch c/o with plug up
	Wye branch with c/o on branch
	Wye branch with c/o on branch up
	S trap with vent
	S trap
	P trap with vent
	P trap
	Cross, screwed pipe only

MISCELLANEOUS

- Pipe cap
- Flanged joint
- Flange w/ blind flange
- Union
- Orifice
- Reducer
- Expansion joint (bellows)
- Grooved–end type coupling
- Expansion joint (sleeve–type)
- Flexible connection
- Flex hose
- Hose connection
- Sight glass
- Discharge to drain
- Gauge glass
- Pipe break double line
- Pipe break single line
- Clean out
- Oil separator
- Grease separator

SWITCHES AND GAGES

- DX — Duplex pressure gauge
- P — Pressure gauge
- C — Compound pressure gauge
- DP — Differential pressure gauge
- V — Vacuum pressure gauge
- TS — Temperature switch
- FS — Flow switch
- PS — Pressure switch
- LS — Level switch
- LS — Level switch (float operated)
- DP — Differential pressure switch
- R — Rate of flow indicator
- HPA — High pressure alarm
- LPA — Low pressure alarm
- LLA — Low level alarm
- HLA — High level alarm
- A — Alarm designation on switches
- S — Shut down designation on switches
- TD P — Pressure transducer
- TD T — Temperature transducer

PIPE DESIGNATIONS

———	SAN	———	Sanitary sewage (above floor)
------	SAN	------	Sanitary sewage (below floor)
———	SSTK	———	Soil stack
———	WSTK	———	Waste stack
------	VSTK	------	Vent stack
— + —	CS	— + —	Combined sewage
—I—I—	IS	—I—I—	Industrial sewage
———	SS	———	Storm sewage (above floor)
------	SS	------	Storm sewage (below floor)
—|—|—	ACID OR CHEM	—|—|—	Acid or chemical
———	SW	———	Waste Service water (non potable)
———	RW	———	Raw water
—-—-	HW	—-—-	Hot water
—--—	CW	—--—	Cold water
———	DWS	———	Drinking water supply
———	DWR	———	Drinking water return

PLUMBING SYMBOLS

MISCELLANEOUS

- Thermostat, electric
- Thermostat, electric (when more than one)
- Thermal bulb
- Thermostat remote bulb
- Expansion valve, thermostatic
- Regulating valve condenser water
- Thermometer
- Finned coil
- Forced convection
- Pipe coil
- Refrigerant strainer
- Refrigerant filter
- Duct heater, electric
- Unit heater (UH–_ _kw)
- Vibration absorber
- Sound attenuator
- Flexible connection
- Flexible duct
- Std branch, supply
- Std branch, return
- Turning vanes 3
- Turning vanes 4
- Exhaust flow
- Supply flow
- Heat exchanger
- Condenser, air cooled
- Condenser, evaporative
- Water cooled
- Condenser, evaporative (cascade system) (H.S. EVAP, L.S. COND)

GRILLES/REGISTER

- Exhaust grille/ register
- Exhaust grille/ register
- Supply grille/ register
- Supply grille/ register
- Door grille
- Ceiling grille/ register (show flow)
- Ceiling grille/register
- Grille/register side view

DIFFUSERS

- Ceiling diffuser 4–way
- Ceiling diffuser 2–way
- Ceiling diffuser 4–way
- Ceiling diffuser 2–way
- Ceiling diffuser round 4–way
- Ceiling diffuser round 2–way
- Ceiling diffuser 2–way
- Terminal unit variable volume box
- Terminal unit mixing box
- Terminal unit reheat box

DAMPERS

- Backdraft damper
- Volume damper manual
- Control damper
- Fire damper, wall opening, plan
- Fire damper, wall opening, section
- Fire damper access and door vertical position
- Fire damper and access door horizontal position
- Relief damper
- Manual splitter
- Fire damper
- Damper motor
- Damper, electric operated
- Damper, pneumatic operated
- Smoke damper access door

FANS and VENTILATORS

- Propeller
- Propeller fan
- Axial fan
- Roof ventilator, louvered
- Roof ventilator, intake
- Roof ventilator, exhaust
- Centrifugal fan (schematic)
- Centrifugal fan side outlet
- Centrifugal fan up outlet
- Centrifugal fan side outlet (plan view)
- Roof ventilator, section view
- Roof ventilator, section view

LOUVERS

- Louver, door or wall
- Louver, door or wall
- Louver and screen
- Louver and screen
- Louver, front view
- Louver, front view
- Louver, front view
- Louver, side view
- Louver, side view

- Supply duct from roof mounted unit
- Return duct to roof mounted unit
- Roof exhauster
- Ceiling supply register
- Ceiling return with manual damper
- Vd manual damper
- Cd–x motor actuated control damper
- Wrg wall return grille with manual damper ducted ceiling return grille with manual damper
- Uc undercut door
- 2–way supply register

ABBREVIATIONS

SA	supply air
RA	return air
TA	transfer air
OA	outside air
MU	make up air
EA	exhaust air
NECU	evaporative cooling unit air
NAC	conditioner (package unit)
NSD	smoke damper
NCD	control damper
NFD	fire damper
VD	volume damper
RFD	relief damper
BDD	backdraft damper
AHU	air handling unit
NFP	propeller fan
NCF	centrifugal fan
WCH	water chiller
CHWP	chilled water pump
CWP	condenser water pump
CV	control valve
DM	damper motor
CFM	cubic feet per minute

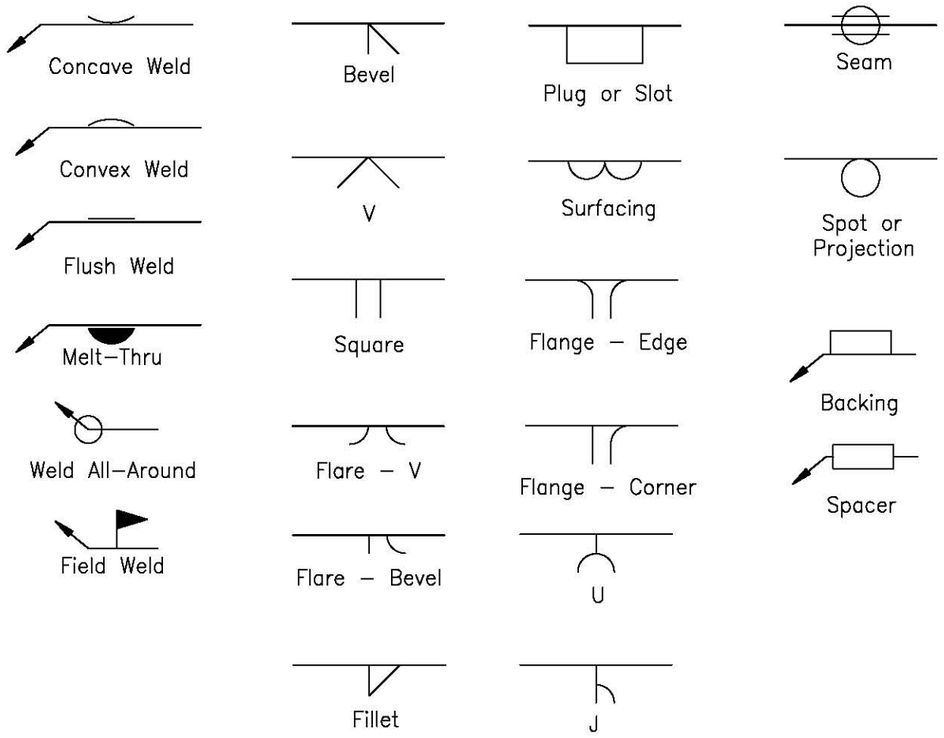
Designations for all HVAC equipment requiring power are proceeded by the letter "N".

HVAC PIPING DESIGNATIONS

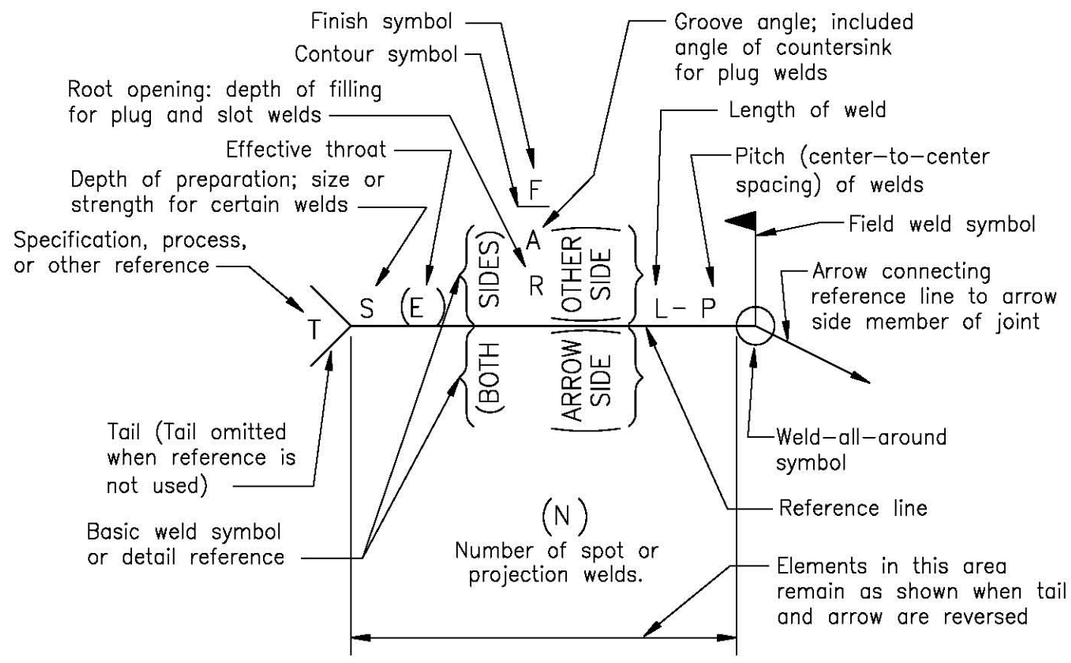
- RD — Refrigerant discharge
- RS — Refrigerent suction
- C — Condenser water supply
- CR — Condenser water return
- CWS — Chilled water supply
- CWR — Chilled water return
- CD — Condensate drain/ above floor
- CD — Condensate drain/ below floor
- D — Drain
- LPS — Low pressure steam
- HPS — High pressure steam
- MPS — Medium pressure steam

HVAC SYSTEM SYMBOLS

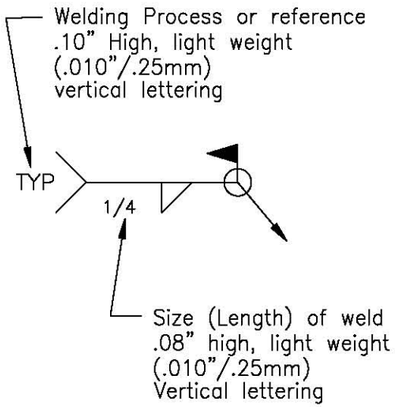
COMMON WELDING SYMBOLS

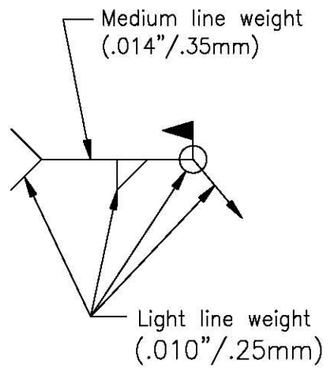


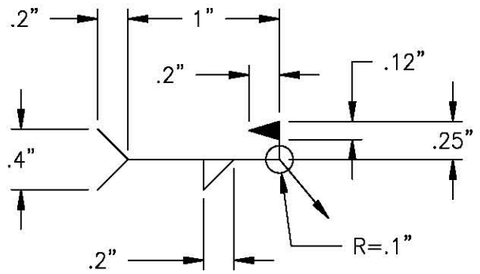
LOCATION OF ELEMENTS OF A WELDING SYMBOL



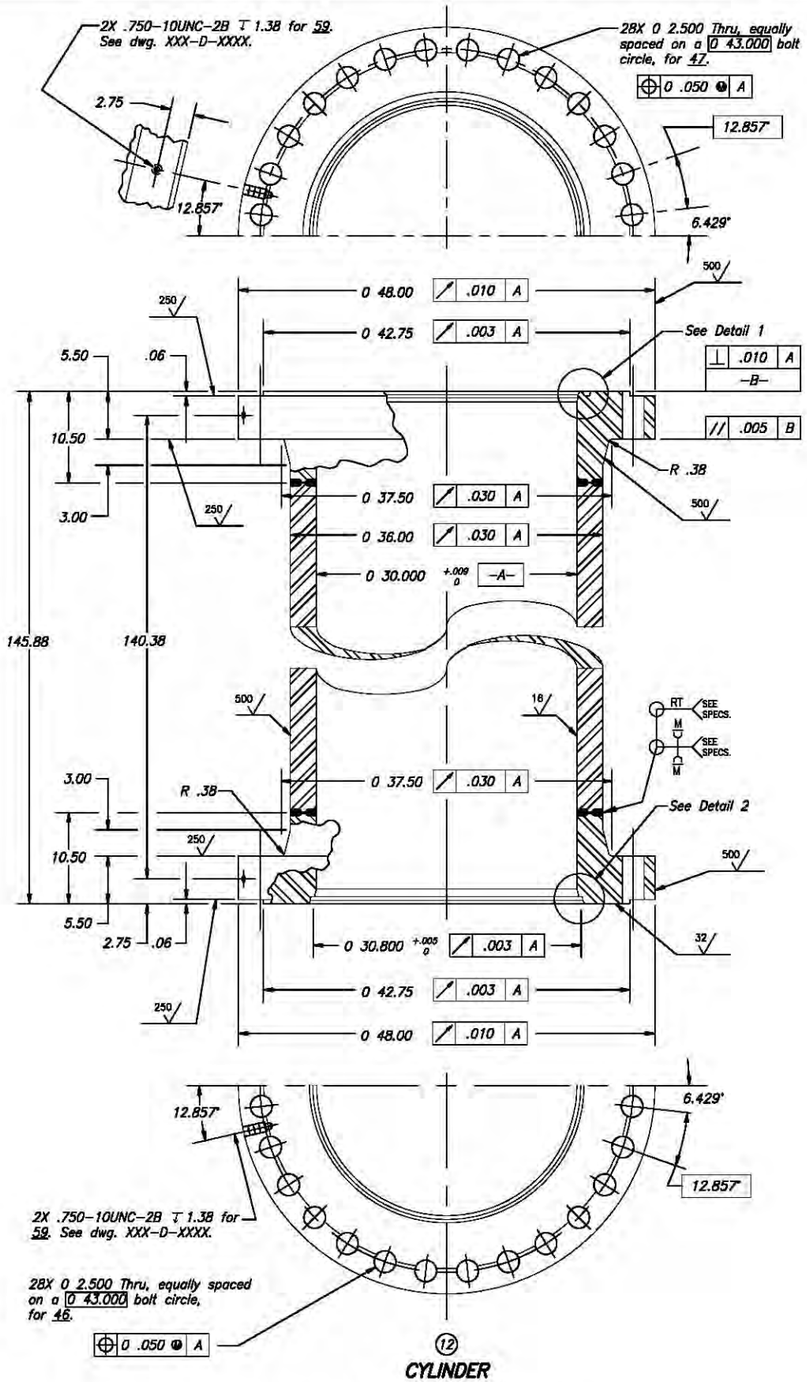
SIZES FOR WELDING SYMBOLS







WELDING SYMBOLS



(12)

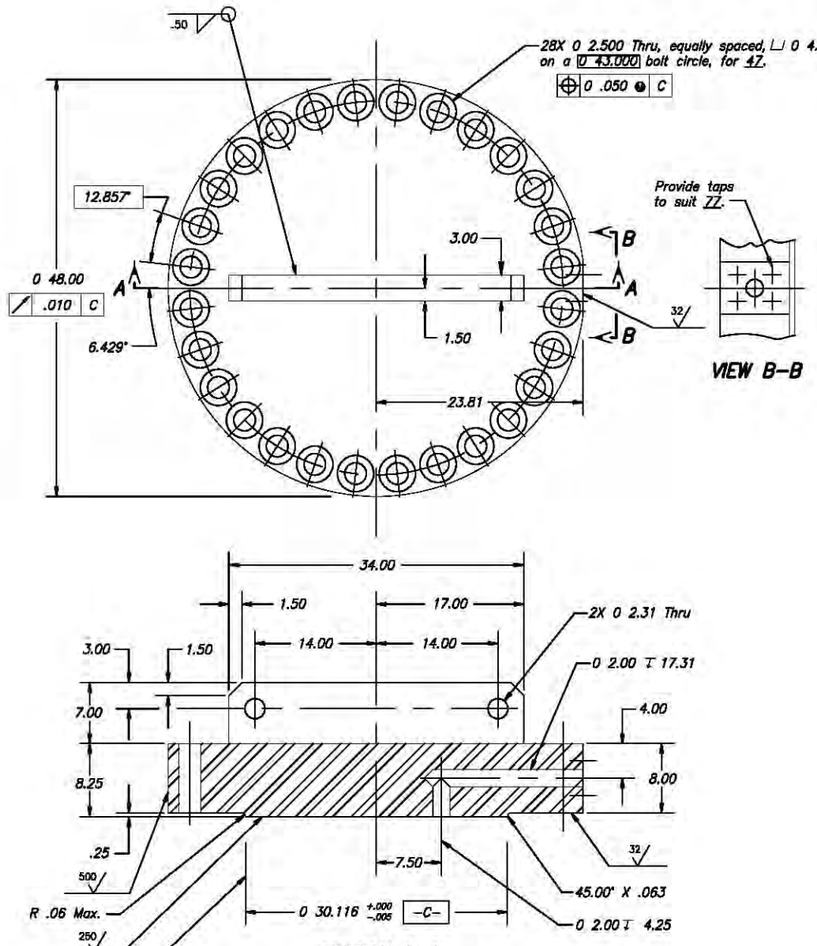
CYLINDER

(SEE SPECIFICATIONS)
MATERIAL

SHELL { CENTRIFUGALLY CAST STEEL – ASTM A27 GRADE 65–35 OR CARBON STEEL PLATE – ASTM A515 GRADE 60 OR 70, OR CARBON STEEL FORGING – ASTM A668 CLASS B.

FLANGES { CARBON STEEL FORGINGS – ASTM A668 CLASS B, OR FORGED OR ROLLED FLANGES – ASTM A105 OR A181 CLASS 60 OR 70.

NOTE: CYLINDER MAY BE FORGED IN ONE PIECE. ONE REQUIRED

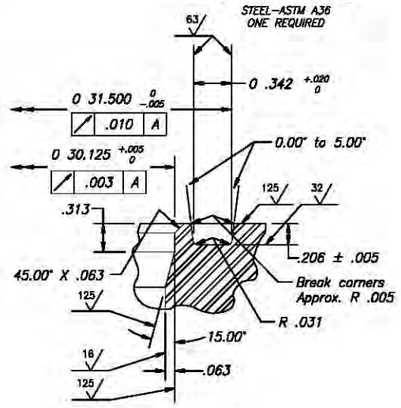


SECTION A–A

(13)

CYLINDER HEAD

STEEL–ASTM A36
ONE REQUIRED



DETAIL 1

DATE AND TIME PLOTTED
Not Plotted
PLOTTED BY
Not Plotted

CAD SYSTEM
AUTOCAD
CAD FILENAME
UNKNOWN

2011–02–02

RECLAMATION
Managing Water in the West

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
STANDARD DRAWING
MONTANA

DRAFTING STANDARDS

TYPICAL MECHANICAL DETAILS

DESIGNED	
DRAWN	
CHECKED	
TECH. APPR.	NAME, PROF. ABBR.
ADMIN. APPROVAL	NAME, TITLE
BILLINGS, MONTANA	YYYY–MM–DD

MECHANICAL DESIGN

PRJ–STA–SEQ

SHEET 1 OF 1

FIGURE 40

HOT ROLLED STRUCTURAL STEEL SHAPE DESIGNATIONS

TYPE OF SHAPE	DESIGNATION
W Shape	W 24x76
S Shape	S 24x100
M Shape	M 8x18.5
American Standard Channel	C 12x20.7
Miscellaneous Channel	MC 12x45
HP Shape	HP 14x73
Equal Leg Angle	L 6x6x3/4
Unequal Leg Angle	L 6x4x3/4
Structural Tee cut from W shape	WT 12x38
Structural Tee cut from S shape	ST 12x50
Structural Tee cut from M shape	MT 4x9.25
Plate	PL 1/2x18
Square Bar	Bar 1
Round Bar	Bar 1 1/4ø
Flat Bar	Bar 2 1/2x1/2
Pipe	Pipe 4 Std Pipe 4x–Strong Pipe 4xx–Strong
Structural Tubing: Square	TS 4x4x.375
Structural Tubing: Rectangular	TS 5x3x.375
Structural Tubing: Circular	TS 3 ODx.250

Standard abbreviations as given in this table are for designating rolled steel sections on drawings that will identify the section group without reference to the manufacturer.

When the length of a rolled member is given, use feet and inches thus: W 24 x 76 x 6–10, or 2 ls–3 1/2 x 3 1/2 x 1/4 x1–11 1/2, or 1–PL 1/2 x 10 x 0–11 1/2.

For practically all other dimensions on structural steel (except depth of sections, pipe diameters, holes, etc.) use feet and inches when over 1–0, and inches only when less than one foot: thus 7 1/2.

The following note should be placed on structural drawings where applicable:

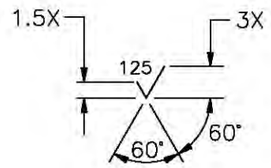
All holes 15/16ø unless otherwise noted. (To be used only when the majority of the holes are of one size.)

STANDARDS FOR STRUCTURAL STEEL DRAWINGS

The symbol used to designate surface roughness is shown in Detail 1.

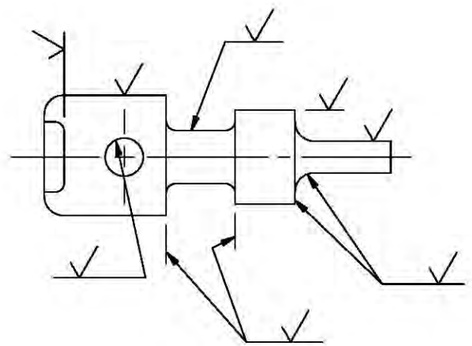
The point of the symbol shall be on the line indicating the surface, on the extension line or on a leader pointing to the surface.

The long leg shall be to the right as the drawing is read. For typical applications of the symbol, see Detail 2.



X = LETTERING HEIGHT

DETAIL 1



DETAIL 2

Preferred roughness average values are: 2, 4, 16, 32, 63, 125, 250, and 500 microinches. Typical roughness average values for various surfaces are:

Honed, lapped, polished or ground – 4 to 63
Shaped or turned – 32 to 500
Milled – 63 to 500

Guide for surface roughness values:

500 (rough) – Non–mating finished surfaces, valve fluidways, exterior of hoist cylinders.

250 (average–normal) – Moderately loaded surfaces in static contact, rubber gasketed joints.

125 (average–high quality) – Medium and looser fits, heavily loaded surfaces in static contact, moderately loaded surfaces which may slide because of expansion.

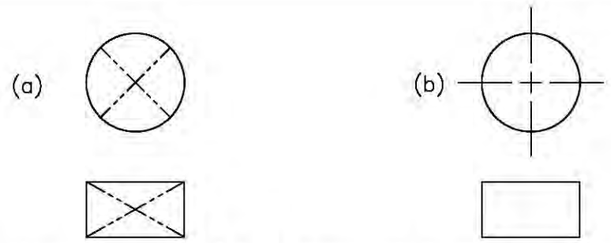
63 (smooth–normal) – Snug and looser fits, gate seals and seats, packing g lands, very heavily loaded surfaces in static contact.

32 (smooth high quality) – Interference and looser fits, bushings and bearing surfaces, pistons, piston rings and grooves, packed sealing surfaces, gear teeth, power screws, and nuts.

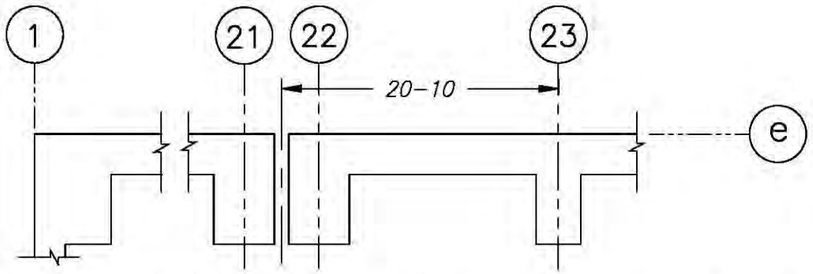
16 (very smooth) – Hydraulic cylinders, piston stems, very close sliding fits.

SURFACE ROUGHNESS

REFERENCE
ANSI Y14.36 SURFACE TEXTURE SYMBOLS

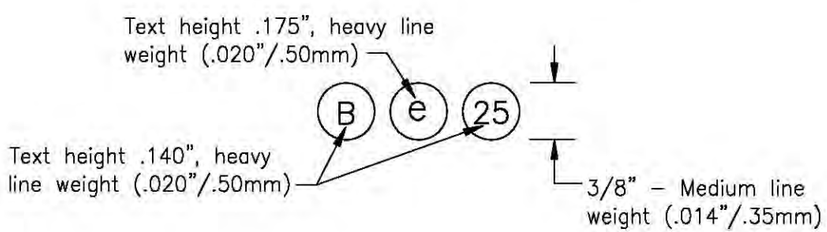


Show open holes as in (a) to distinguish from recesses as shown in (b).



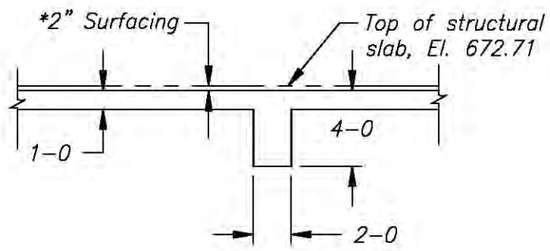
Drawings for major buildings usually have building reference lines which are used as a coordinate system from which to reference and dimension building features and details.

REFERENCE LINE DESIGNATIONS



ABBREVIATIONS

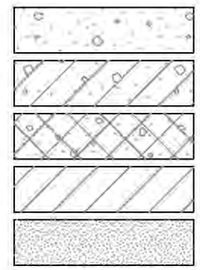
bf – bottom face
CJ – Construction joint
Cr.J – Contraction joint
Ct.J – Control joint
ef – each face
EJ – Expansion joint
El. – Elevation
ff – far face
HP – High point
LP – Low point
MSN1 – Metal seal––Type N1
MSN2 – Metal seal––Type N2
MSZ – Metal seal––Type Z
nf – near face
OCJ – Optional construction joint
SP – Sewer pipe
tf – top face
TW – Tail water
VCJ – Vertical construction joint
WP – Working point
WS – Water surface, water stop
WSA – Waterstop––Type A
WSB – Waterstop––Type B
WSD – Waterstop––Type D
WSE – Waterstop––Type E
WSF – Waterstop––Type F
WSG – Waterstop––Type G
WSH – Waterstop––Type H



If a concrete floor surface is to receive an additional surfacing, show all dimensions to the unfinished surface as indicated above. Show elevation in feet to two decimal places.

CONCRETE SYMBOLS

The different concrete placements are indicated by the following symbols:



Concrete –– First stage

Concrete –– Second stage

Concrete –– Blockout

Existing concrete or concrete in adjacent structures

Grout

DIMENSIONS

All dimensions to a joint are to the centerline of the joint unless otherwise shown.

Dimensions to beams, columns, and walls are from reference lines or other control points.

Dimensions in parentheses ( ) on plans are beam depths.

Beam and slab depths shall be measured from the top of the structural slab. Dimensions given for the depth of recesses are from the surface of the structural concrete.

Thickness' shown for walls and slabs placed against soil or rock are minimum dimensions.

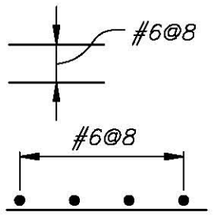
CONCRETE ABBREVIATIONS, SYMBOLS AND DESIGNATIONS

ABBREVIATIONS

bf = bottom face	ff = far face	nr = near row
bl = bottom layer	fr = far row	ns = near side
br = bottom row	fs = far side	oc = on center
ec = each corner	if = inside face	of = outside face
ef = each face	ir = inside row	or = outside row
er = each row	ml = middle layer	tf = top face
es = each side	mr = middle row	tl = top layer
ew = each way	nf = near face	tr = top row

add'l = additional
cl. = clear
ctr. = center or centers
d_b = nominal diameter of reinforcing bar
eq. spc. = equally spaced, equal spaces
spc. = space or spaces
uv = uniformly varying lengths of bars between lengths shown

SYMBOLS



Indicates a group of the same size bars equally spaced.

An open circle at the end of a bar indicates a bend with the bar turned away from the observer.

A closed circle at the end of a bar indicates a bend with the bar turned towards the observer.

Indicates a lapped splice, not a bend in the bar.

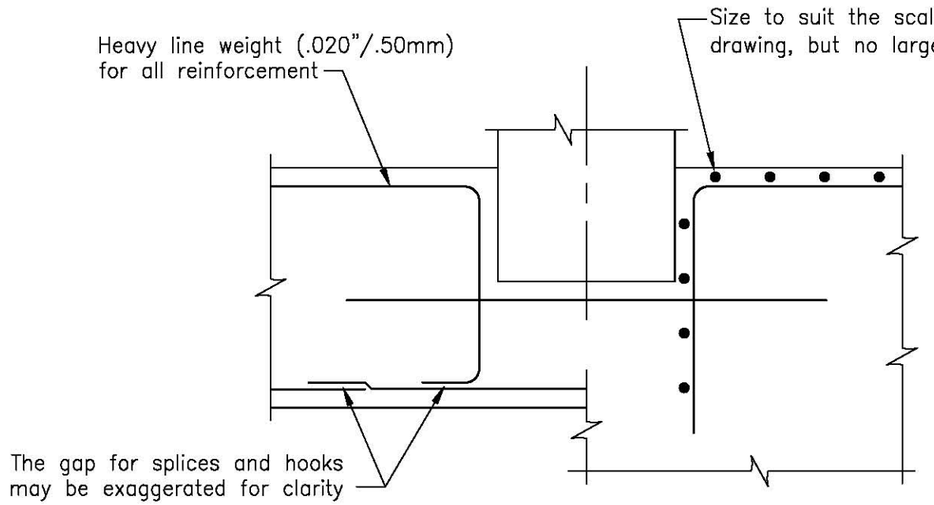
Concrete symbol is used with reinforcement when cutting thru a wall, when a window is cut to show reinforcement the concrete symbol is not shown.

DIMENSIONS

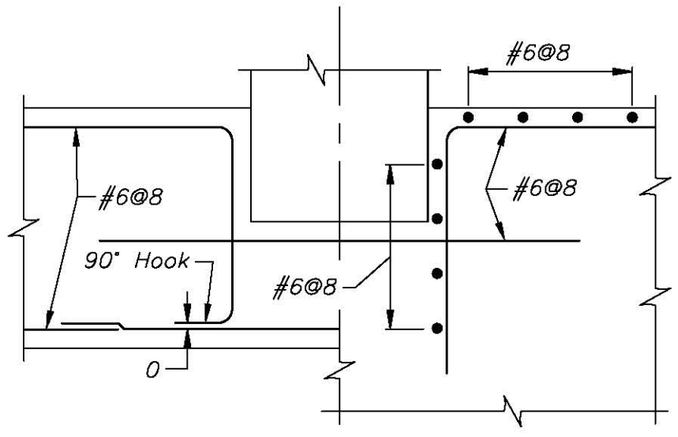
Dimensions are to the centerline of the bars except for embedment of hooks, which are dimensioned to the outside of the bar. Clear cover dimensions are marked "cl."

SPACING

The first and last bars in walls and slabs, stirrups in beams, and ties in columns are to start and end at a maximum of one half of the adjacent bar spacing.



TYPICAL LINE WEIGHTS



TYPICAL CALLOUT PLACEMENT

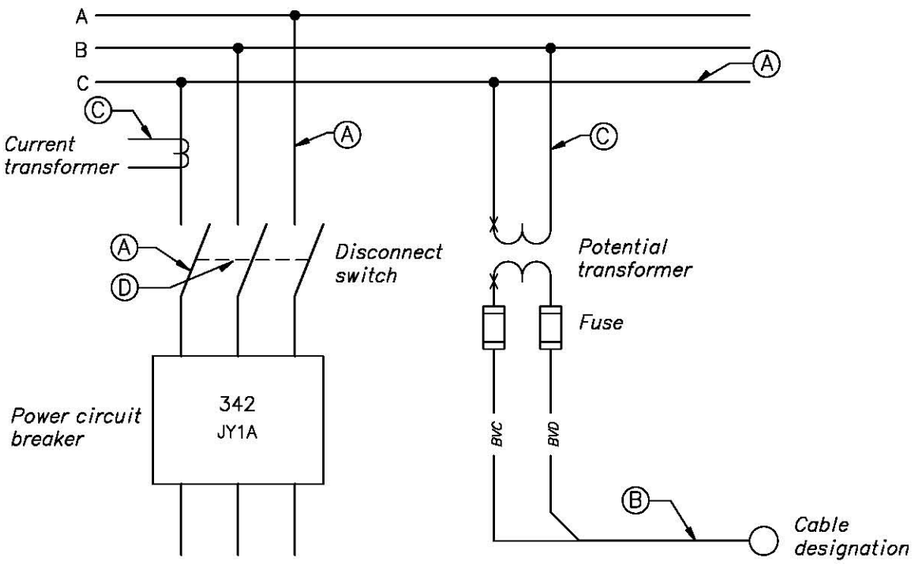
For general notes and minimum requirements for detailing reinforcement, see Standard Drawing 40–D–6263.

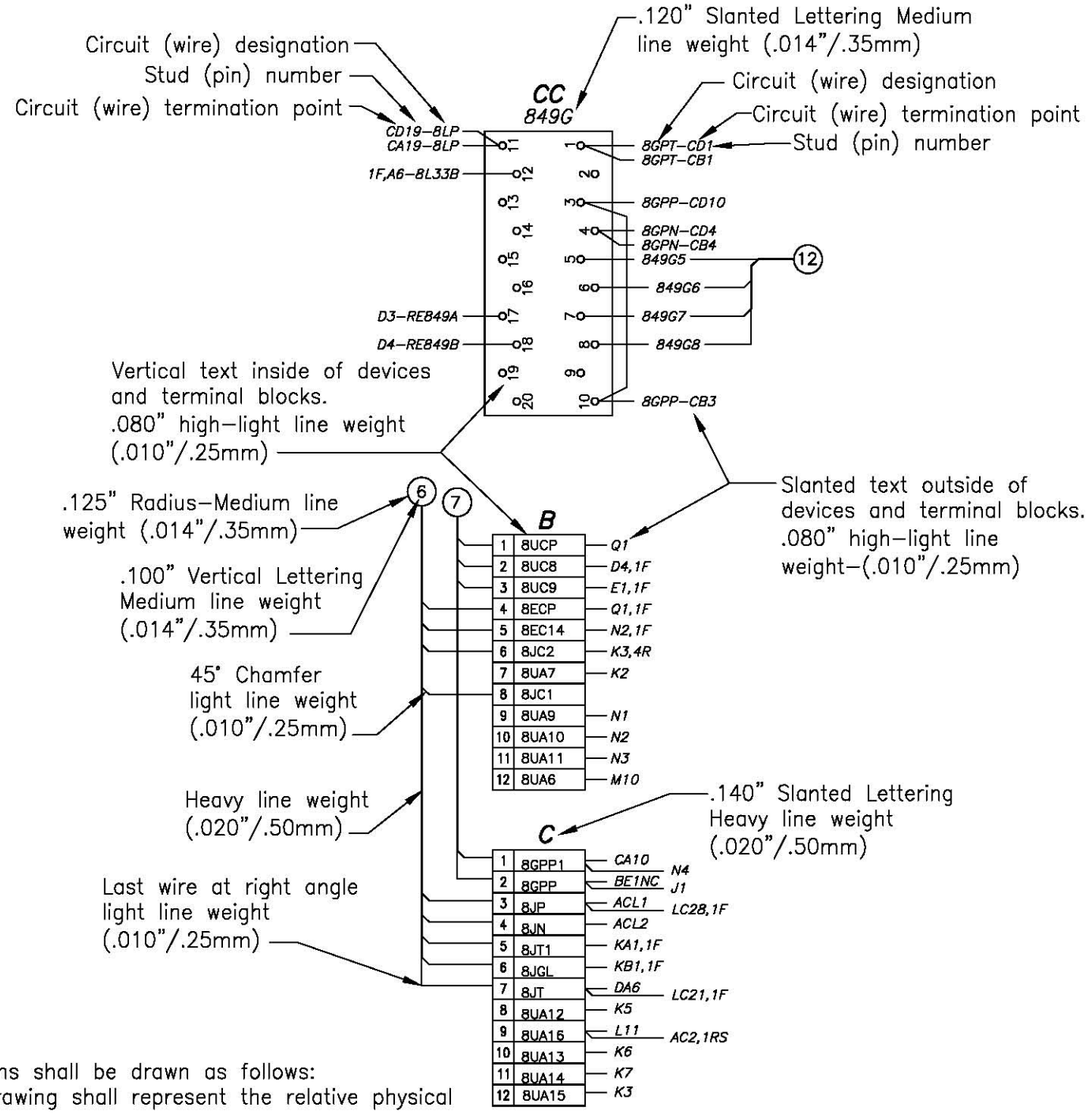
REINFORCEMENT ABBREVIATIONS, SYMBOLS AND LINE WEIGHTS

WEIGHT OF LINES

The following relative weights of lines apply to conductors and symbols shown on drawings.

A – Very heavy, (.028"/.70mm)	——●——	Main power circuits and bus, and auxiliary,power bus.
B – Heavy, (.020"/.50mm)	——●——	Auxiliary power and field circuits, and control bus. Cabled conductors.
C – Medium, (.014"/.35mm)	——●——	Control and instrument transformer circuits and other small wiring.
D – Very light, (.007"/.18mm)	——	Panel and device outlines, mechanical connections, any non–current–carrying parts. Not to be used for wiring.





EXPLANATION OF POINT–TO–POINT WIRING DIAGRAMS

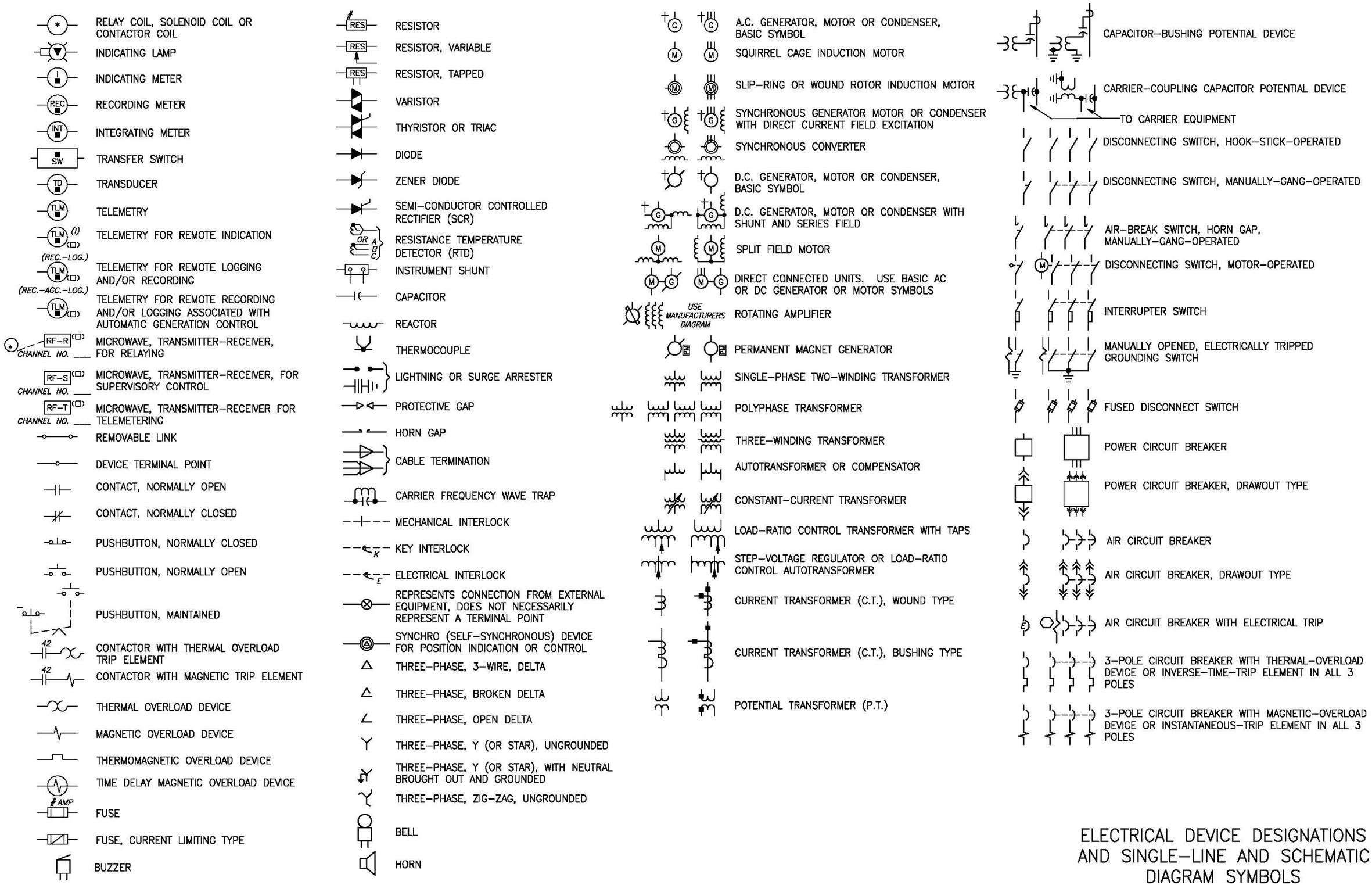
A. Double letters in bold face, such as **AA**, indicate the location of each device on the wiring diagram except for terminal blocks.

B. Single letters in bold face, such as **A**, indicate the location of each terminal block on the wiring diagram.

C. A control board is made of many sections which in turn are made of different panels. The sections are designated numerically 1 through "n", with "n" being the last section of the control board. The different panels are designated alphabetically as follows:
1. F–indicates the front panel.
2. R–indicates the rear panel.
3. S–indicates the swing panel when there is only one swing panel per section.
4. FS and RS–indicate the front and rear swing panels, respectively, when there are two swing panels per section.
5. SS–indicates the shipping split terminal block panel/section location.

D. All point–to–point wiring diagrams shall be drawn as follows:
1. All devices shown on the drawing shall represent the relative physical location of the devices.
2. Circuit (wire) designations shall be located next to the device stud (pin).
3. The circuit (wire) termination point shall be placed second from the device stud with a hyphen between the circuit designation and the circuit termination point.
4. The panel designation (number) of the wire shall be place in the last position from the device stud with a comma between the circuit termination point and the panel destination. All panel wiring within the same panel will not require a panel destination.
5. Therefore, an example of point–to–point wiring is "LBCP4–HC4, 6F" The circuit (wire) designation is LBCP4. The circuit (wire) termination point is at device HC, stud (pin) number 4, located on the front panel of section 6.

ELECTRICAL WIRING DIAGRAMS AND LINE WEIGHTS



ELECTRICAL DEVICE DESIGNATIONS AND SINGLE–LINE AND SCHEMATIC DIAGRAM SYMBOLS

SYMBOLS

AA 9–6 — Fluorescent luminaire

a B 25–0 — Incandescent or high intensity discharge luminaire

C — Asymmetric luminaire or floodlight. Arrow indicates axis of beam.

AA — Fluorescent emergency or normal/emergency luminaire

D or XX — Emergency luminaire. Exit signs are designated "X" or "XX". Where directional arrows are required on signs, appropriate arrows are shown on plans.

D.C. emergency lighting unit, plug–in battery type. Arrows indicate axis of beam and number of lamps.

Letters in luminaire symbol refer to type of luminaire. Single letter designation indicates incandescent or high intensity discharge luminaire. Double letter designation indicates fluorescent luminaire. Number beside luminaire symbol indicates mounting distance from finished floor to be bottom of suspended luminaire. Letter beside luminaire symbol identifies controlling switch.

- S_a Single–pole switch. Where shown, letter indicates luminaries to be controlled.
- S_2 Double–pole switch
- S_3 Three–way switch
- S_4 Four–way switch
- S_D Dimmer switch
- S_K Key operated switch
- S_{MC} Momentary contact switch 3–position, 2–circuit, center position "OFF"
- S_M Manual motor–starting switch
- S_{PL} Switch with pilot light
- S_{3P} Three–pole switch
- S_S Selector switch, maintained contact, 3–position, 2–circuit, center position "OFF"
- S_T Timer switch
- DS Disconnect switch

- Duplex plug receptacle
- Ground fault circuit interrupter duplex plug receptacle with weatherproof cover
- Heavy duty 2–pole, 3–wire plug receptacle
- Single plug receptacle for emergency lighting unit (120 volt or 277 volt as required)
- Single three–phase plug receptacle
- Floor duplex plug receptacle (flush mounted)
- WP Weatherproof coverplate
- or Octagonal concrete ring with 1" threaded elbow
- 12 Panelboard circuit number
- (1220) Reference drawing showing conduit or equipment
- (936) Reference drawing showing wiring diagram or panel schedule
- P Photoelectric control unit
- Metal raceway channel
- M Motor
- T Thermostat
- B Rotating beacon
- 1"–8LSLB Indicates conduit size and designation. Designation is composed of conduit number and panel designation.
- Arrow indicates that conduit is to be extended to panelboard.
- 12 Conduit number as shown on conduit schedule.
- In "Plan" indicates conduit exiting bottom of box. If no conduit symbol is attached to "dot", then conduit continues on drawing showing elevation below. In "Section" or "Elevation" indicates conduit exiting opposite side of box.
- In "Plan" indicates conduit exiting top of box and continuing on same "Plan".
- In "Plan" indicates conduit exiting top of box and continuing on drawing showing elevation above. In "Section" or "Elevation" indicates conduit exiting near side of box.

- Exposed conduit
- Embedded conduit
- Concealed but not embedded conduit
- PVC coated buried conduit
- Flexible conduit
- Expansion coupling
- Expansion–deflection coupling
- Conduit coupling
- Sealing fitting
- Conduit bending toward observer
- Conduit bending away from observer
- Capped conduit

EQUIPMENT DESIGNATIONS

L S P B

- L — EQUIPMENT TYPE DESIGNATOR
- S — LOCATION DESIGNATOR
- P — EQUIPMENT DESIGNATOR
  - L See standard drawing 104–D–271
  - – See standard drawing 104–D–272
  - D Distribution panels feeders to lighting panels
  - L Lighting panels 277 volt lighting
  - P Lighting panels misc. 120 volt power
  - K Transformers
  - C Control panels
  - E Emergency power units
  - S Control station or special switch
  - EC Emergency control panel
  - KD Combination transformer load center
- B — ITEM SEQUENCE DESIGNATOR A, B, C, ... (OMIT WHERE NOT NEEDED)

LIGHTING SYSTEM SYMBOLS

DETECTORS

- Smoke Detector Ionization
- Smoke Detector Photoelectric
- Heat Detector
- Flame Detector
- Gas Detector
- ? Ionization Detector

DETECTORS FOR VALVES

- Tamper Detector
- Dry Pipe Detector
- Alarm Switch/Detector
- Detector on Valve
- Deluge
- Angle Deluge
- Sprinkler Riser

EXTINGUISHERS

- Fire Extinguisher Type 1 (Carbon Dioxide)
- Fire Extinguisher Type 2 (Other Chemical or Liquid)

FIRE EXTINGUISHER

- Foam Extinguisher
- Dry Chemical Extinguisher (Electrical Liquid Gas)
- CO_2 Extinguisher
- Halon Extinguisher
- Hose Station Charged Standpipe

CO_2 BOTTLES

Plan Section Front

Single CO_2 Bottles

Multiple CO_2 Bottles

SPRINKLERS

Plan Section

- Pendant–Type Fusible Link
- Pendant–Type Open
- Upright Fusible Link
- Upright Open
- Wall 180°
- Guard on Sprinkler

MISCELLANEOUS

- Non–sprinklered Space
- Fully Sprinklered Space
- Manually Actuated System
- Carbon Dioxide, Automatic Actuated System
- Carbon Dioxide, Manually Actuated System
- Thrust Block
- Fire Pump Test Header (Free Standing)
- Fire Pump Test Header (Free Wall)

EQUIPMENT

Plan Section Front

- Fire Hose Cabinet
- Fire hose reel (wall mounted)
- Fire hose reel (hung from supply pipe)
- Fire hose reel (side view)
- Fire hose reel (front view)

FIRE HYDRANTS

- Two–Way Wall Hydrant
- Single Wall Hydrant
- Fire Hydrant (Three Hose)
- Fire Hydrant Two Hose
- Fire Hydrant Two Hose/Pumper
- Fire Hydrant Two Hose (Housed)
- Two–Way Fire Department Connection Siamese Connection (Wall or Free Standing) (Wall with or without Plate)
- Fire Department Connection Siamese Connection (Wall or Free Standing) (Wall with or without Plate)
- Two–Way Fire Department Connection, Siamese Connection
- Fire Department Connection Siamese Connection Free Standing

- Manual pull station (Red) mounted 48–inches above finished floor unless otherwise indicated
- Ionization type smoke detector
- Photoelectric type smoke detector
- DUCT Duct mounted ionization type smoke detector with sampling tubes (length to span duct laterally)
- Projected beam type smoke detector (Source and receiver)
- Ultraviolet type flame detector
- Infrared type flame detector
- Spot type thermal detector
- Linear type thermal detector
- Fire sprinkler water flow switch (Switch provided with mechanical equipment)
- Tamper switch
- Pressure switch
- Alarm bell
- Alarm horn
- Strobe light
- Alarm horn with strobe light
- Alarm bell with strobe light
- Remote indicating light for detector concealed above suspended ceiling
- Rotating beacon
- Magnetic door holder
- Halon discharge manual pull station (Red)
- Halon abort station (Black)
- Electrically operated sprinkler valve
- Electrically operated actuator or valve sprinkler, deluge or Halon system
- Power relay

FIRE PROTECTION PIPE DESIGNATIONS

- FPW Fire Protection Wet Pipe
- FPD Fire Protection Dry Pipe
- FPC Fire Protection Chemical (CO) Pipe

SYMBOLS

- EOL End of line device
- (1220) Reference drawing showing conduit or equipment
- (936) Reference drawing showing wiring diagram
- 1"–8FSC2 Indicates conduit size and designation. Designation is composed of conduit number and equipment designation.
- Arrow indicates that conduit is to be extended to fire panels.
- Z7–2 Designation adjacent to detector, manual pull station or fire sprinkler water flow switch symbol denotes zone and sequence of wiring. Detector number Z7–2 is the second detector on zone seven. A designation label shall be permanently affixed to each device.
- B6 Designation adjacent to bell or horn symbol denotes alarm circuit (A, B, C,...) and sequence of wiring.
- (12) Conduit number as shown on conduit schedule.
- In "Plan" indicates conduit exiting bottom of box. If no conduit symbol is attached to "dot", then conduit continues on drawing showing elevation below. In "Section" or "Elevation" indicates conduit exiting opposite side of box.
- In "Plan" indicates conduit exiting top of box and continuing on same "Plan".
- In "Plan" indicates conduit exiting top of box and continuing on drawing showing elevation above. In "Section" or "Elevation" indicates conduit exiting near side of box.
- Octagonal concrete ring with 1" threaded elbow.

- Exposed conduit
- Embedded conduit
- Concealed but not embedded conduit
- Flexible conduit
- Expansion coupling
- Expansion–deflection coupling
- Conduit coupling
- Sealing fitting
- Conduit bending toward observer
- Conduit bending away from observer
- Capped conduit

EQUIPMENT DESIGNATIONS

F S C 2

- F — SYSTEM DESIGNATOR — See standard drawing 104–D–271 (e.g. F – Fire, N – HVAC)
- S — LOCATION DESIGNATOR — See standard drawing 104–D–272 (e.g. S – Service Bay, 4 – Unit Bay 4)
- C — EQUIPMENT DESIGNATOR
  - C Control Panel
  - A Annunciator Panel
  - G Graphic Annunciator Panel
  - P Panelboard or Load Center
  - K Transformer
  - J Junction Box
  - D Door Holder
  - V Valve
- 2 — ITEM SEQUENCE DESIGNATOR 1, 2, 3, ... (Omit where not needed)

FIRE PROTECTION, FIRE DETECTION AND ALARM SYSTEM SYMBOLS

LINE WEIGHTS

	Inches	MM
Extra Light *	(.005)	(.12)
Very Light	(.007)	(.18)
Light	(.010)	(.25)
Medium **	(.012)	(.30)
Medium	(.014)	(.35)
Heavy	(.020)	(.50)
Heavy **	(.025)	(.60)
Very Heavy	(.028)	(.70)
Bold	(.039)	(1.0)

LINE TYPES

Continuous		Creek	
Short dashed		Property line	
Long dashed		Trail	
Extra long dashed		Building setback line	
Centerline (short)		New contours	
Centerline (long)		Existing contours	
Phantom (short)		Drainage lines	
Phantom (long)		Fence	

NOTE

The basic line types above are shown light weight, but may be used with any line width as necessary to clarify the drawing.

* Care should be used with this line weight, as it may not reproduce at half size.

** This is a variation of the standard line weight and is included for use on architectural drawings only.

CONTINUOUS VERY HEAVY LINES

Title block border lines, schedule border lines and accent lines.

CONTINUOUS HEAVY LINES

Selected border lines, Drawing perimeter lines; Floor–wall–ceiling lines in interior elevations; Mass profile lines in large scale section details; Wall lines in reflected ceiling plans; Accent lines in the more abstract drawings to identify the most important drawing contents

CONTINUOUS MEDIUM LINES

Mass profile lines in small scale sections; Existing construction to remain; Building component lines and building feature lines in elevation and plan view.

CONTINUOUS LIGHT LINES

Building element lines, internal mass component lines in sections and small scale sections through buildings; Material indications in section and elevation; Building component lines and building feature lines in elevation and plan view.

PHANTOM LINE

Property lines or building reference lines– Light, medium or heavy weight

MATCH LINE

Match lines to connect separate drawings – Heavy weight
To limit or reduce size of drawing – Light weight

SHORT DASHED LINES

Future construction, items not in contract or hidden lines or imbedded items in front or below observer. ALWAYS NOTE DASHED LINES – Light or medium weight

LONG DASHED LINES

Existing construction to be removed or hidden lines or imbedded items in back or below observer. ALWAYS NOTE DASHED LINES – Light or medium weight

EXTRA LONG DASHED LINES

Roof over hang, building setback and easement lines. ALWAYS NOTE DASHED LINES – Light or medium weight

ARCHITECTURAL LINE SYMBOLS AND WEIGHTS

LETTER SIZE

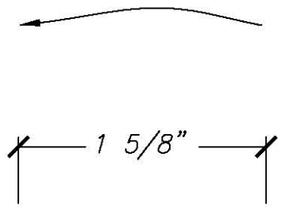
The text used on architectural drawings shall be determined by the Project Architect or Landscape Architect in charge of the specification drawings. Their decision shall be a combined effort with the clientele involved with the specific project and what mode or modes of interfacing is common to each. Fonts must be available to all offices. No special fonts are allowed unless the originating office provides the fonts to all offices. Care should be exercised on any lettering .08" or smaller when drawings will be reduced to half size for publication or printing.

Lettering on drawings should conform to the following sizes and line thickness:

PURPOSE OF LETTERING	HEIGHT	LINE THICKNESS INCHES	MM
Notes. dimensions	.120"	.014"	0.35
TITLES (SECTION A–A, DETAIL 1, NOTES, ETC.)	.175"	.020	0.50
SUBTITLES, NOTES UNDER TITLES	.100"	.010"	0.25

ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
1234567890 3/8

LEADERS AND DIMENSIONS



NOTE LEADER LINES – Splined continuous light lines with arrowheads

DIMENSION LINES – Continuous light lines with tick marks (Not arrowheads), use feet and inch marks

ARCHITECTURAL LETTERING AND DIMENSIONING

DOOR REFERENCE

schedule method

direct method

Use either door reference symbol–schedule method or direct reference method to reference door frame and/or door information in a set of architectural working drawings. Where more detailed information is required, use the schedule method of door referencing. Where less detailed information is required, use the direct reference method of door referencing. Place the door reference symbol in or near doorways on small scale plans only.

204 –Door number
2 – Floor number
04 – Door opening (second floor)

See list of drawings for sheet numbers on which door schedules, door types, door frame details are presented.

6 – Door frame detail number
b – Hardware group letter
D – Door type

See list of drawings for sheet numbers on which door schedules, door types, door frame details are presented. See specifications for contents of hardware group letter.

ROOM REFERENCE

Use the room reference symbol with name above to reference room information. Place the symbol in or near rooms on small scale floor plans, detail floor plans, finish floor plans, reflected ceiling plans. If required to clarify drawings, place the symbol without accompanying room name in rooms on small scale sections through building.

BATH – Room name
306 – Room number
3 – Floor number
06 – Space number (on third floor)

See room finish schedule for room and stairway materials and finishes, and room detail sheet numbers. See list of drawings for sheet numbers on which room finish schedules are presented.

MULTIPLE INTERIOR ROOM ELEVATIONS

(2345)

Show the symbol on floor plan for reference to interior elevations.

(2345) – Reclamation issued number on which drawing is presented.

INTERIOR ROOM ELEVATION

(2345)

Show the symbol on floor plan for reference to interior elevations.

(2345) – Reclamation issued number on which drawing is presented.

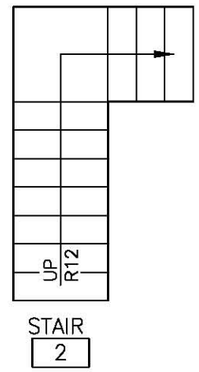
WINDOW REFERENCE

Use the window reference symbol to reference window information. Place the symbol in or near punched windows on exterior elevations only.

3 – Window detail number
D – Window type

See list of drawings for sheet numbers on which window types, window details are presented.

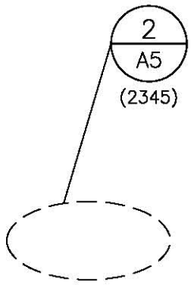
STAIRWAY REFERENCE & DIRECTION INDICATION



Use the stairway reference symbol and stairs direction indication to reference stair information and show stairs direction. Place the symbol with accompanying name (STAIR) in or near stairways on small scale floor plans, detail floor plans, finish flooring plans, and reflected ceiling plans. If required to clarify drawings, place the symbol without accompanying name in stairways on small scale sections through building. The stair direction indication shall reference "UP" or "DN" and the "NUMBER OF RISERS" as shown.

2 – Stairway number
R12 – 12 Risers,
UP or DN (Down) as indicated (Arrow indicates direction)

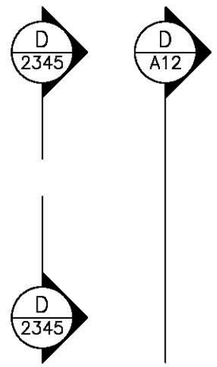
ARCHITECTURAL BUILDING SYMBOLS



DETAIL REFERENCE

Use the detail reference symbol to coordinate details, from plans, elevations, etc. to detail sheets. The ballooned area shows the extent of the detail.

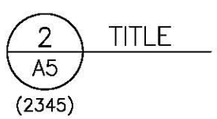
2 – Detail reference number
A5 – Sheet number on which drawing is presented (Architectural sheet number A5)
(2345) – Reclamation issued sheet number on which drawing is presented



SECTION CUT REFERENCE

Show the Section Cut Symbol on Plans and Elevations for building sections and wall sections. Show direction of section view with arrow.

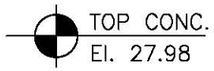
D – Section reference letter
A12 – Sheet number on which drawing is presented (Architectural sheet number A12)
(2345) – Reclamation issued sheet number on which drawing is presented



VIEW REFERENCE AND TITLE

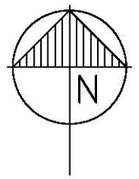
Use the view reference symbol to coordinate sections, details with floor plans, reflected ceiling plans, etc.

2 – Detail reference number
F – Section reference letter
305 or A5 – Sheet number on which drawing is presented (Architectural sheet number A5)
(2345) – Reclamation issued number on which drawing is presented



ELEVATION TARGETS

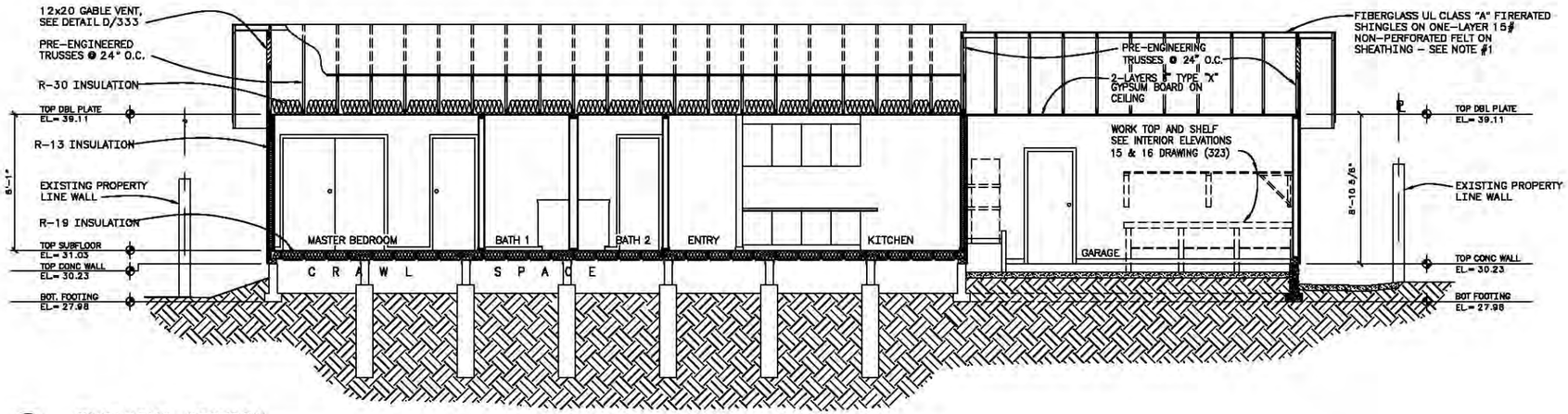
Use the elevation target symbol to show construction elevations at critical points (Bottom of footing, top of concrete wall, top of plate, etc.) on building elevations, sections and details as necessary to coordinate drawings.



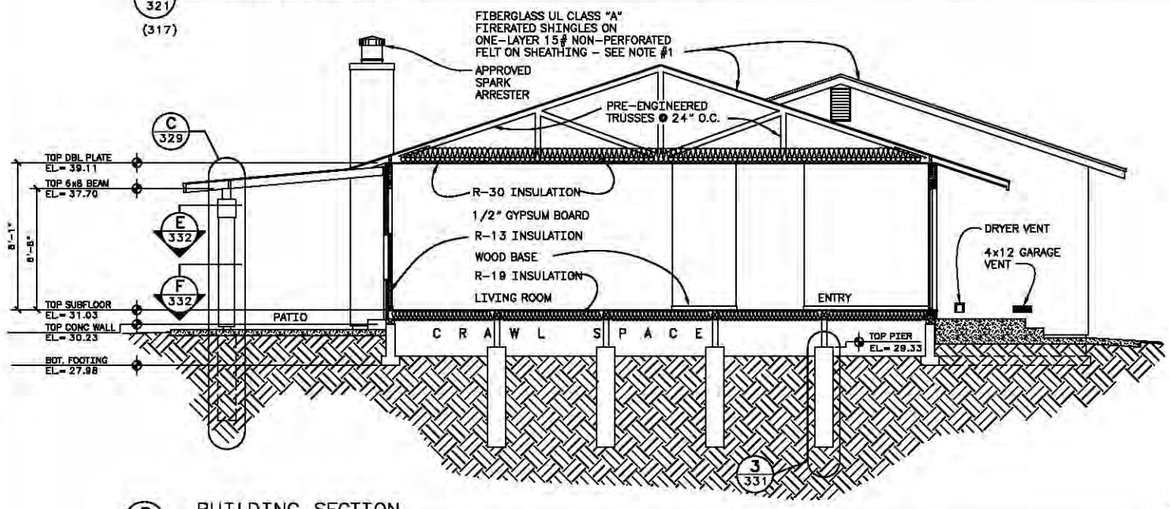
NORTH ARROW REFERENCE

Buildings are typically drawn with the North orientation toward the top of the page. Sometimes this is not possible, therefore we must rotate the north arrow to indicate which direction is North in relationship to the building.

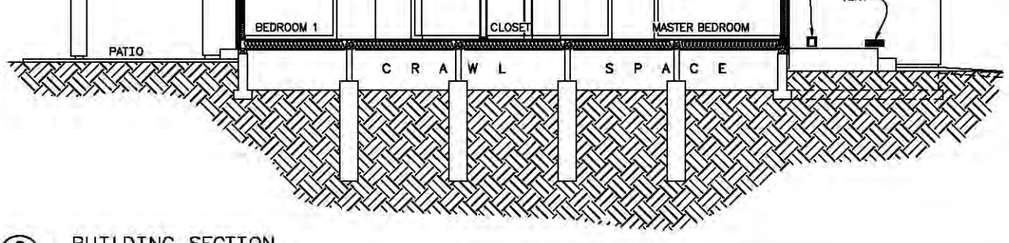
ARCHITECTURAL DETAILING SYMBOLS



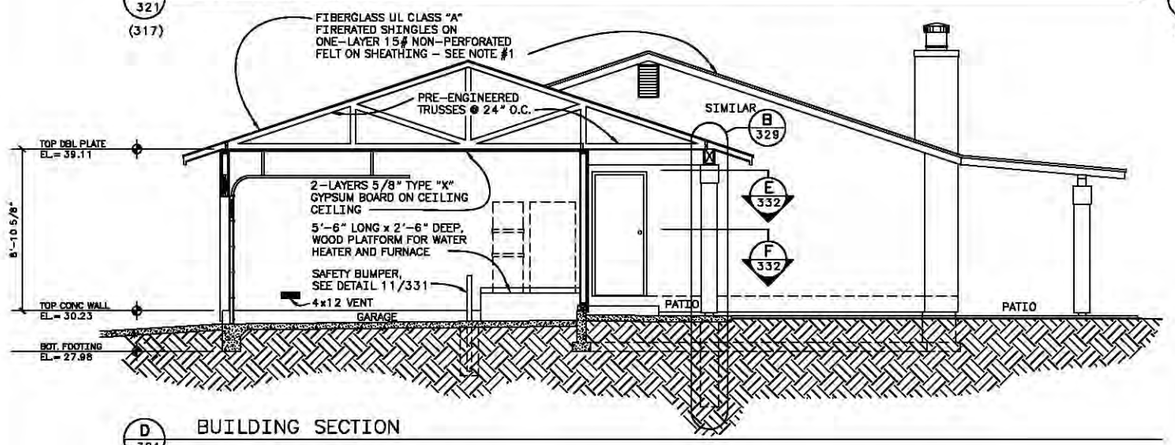
A/321 (317) BUILDING SECTION



C/321 (317) BUILDING SECTION



B/321 (317) BUILDING SECTION



D/321 (317) BUILDING SECTION

1 0 5 10 15
SCALE OF FEET

GENERAL NOTES

1. ROOF SHEATHING:
15/32 APA RATED SHEATHING, 32/16, EXPOSURE 1, NAILED TO TRUSSES w/8d COMMON NAILS @ 6" O.C. AT EDGES AND 12" O.C. AT INTERMEDIATE NAILING.

2. WALL SHEATHING:
15/32 APA RATED SHEATHING, 32/16, EXPOSURE 1, NAILED TO STUDS w/8d COMMON NAILS @ 6" O.C. AT EDGES AND 12" O.C. AT INTERMEDIATE NAILING.

RECLAMATION
Managing Water in the West

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
STANDARD DRAWING
MONTANA

DRAFTING STANDARDS
ARCHITECTURAL
TYPICAL BUILDING SECTIONS

DESIGNED
DRAWN
CHECKED
TECH. APPR. NAME, PROF. ASSOC.
ADMIN. APPROVAL NAME TITLE
BILLINGS, MONTANA YYYY-MM-DD

ARCHITECTURAL BUILDING SECTIONS

PRJ-STA-SEQ

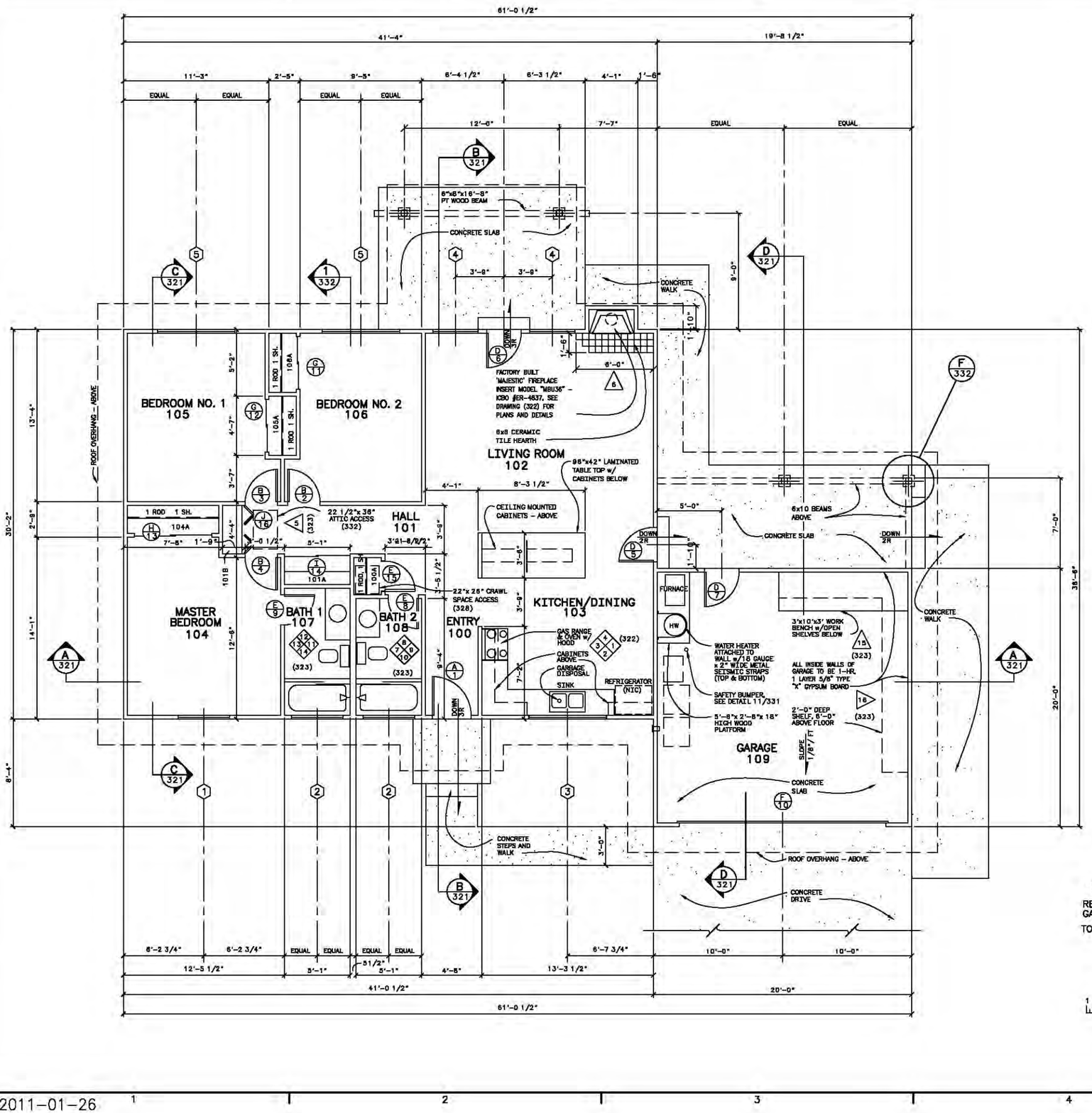
SHEET 1 OF 1

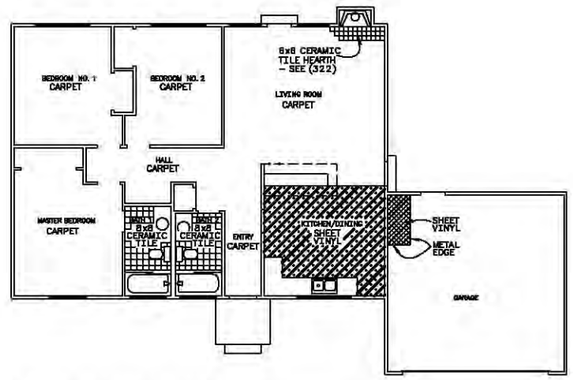
DATE AND TIME PLOTTED
Not Plotted
PLOTTED BY
Not Plotted

CAD SYSTEM
AUTOCAD
CAD FILENAME
UNKNOWN

2011-01-26

FIGURE 52





A 317 FLOOR FINISH PLAN

SQUARE FOOTAGE

RESIDENCE	1244 SF
GARAGE	400 SF
TOTAL	1644 SF

8 0 8 16 SCALE OF FEET

1 0 5 10 15 SCALE OF FEET

RECLAMATION
Managing Water in the West

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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
STANDARD DRAWING
MONTANA

DRAFTING STANDARDS
ARCHITECTURAL
TYPICAL BUILDING DETAILS

DESIGNED
DRAWN
CHECKED
TECH. APPR. NAME, PROF. ASSOC.
ADMIN. APPROVAL NAME TITLE
BILLINGS, MONTANA YYYY-MM-DD

ARCHITECTURAL BUILDING PLAN

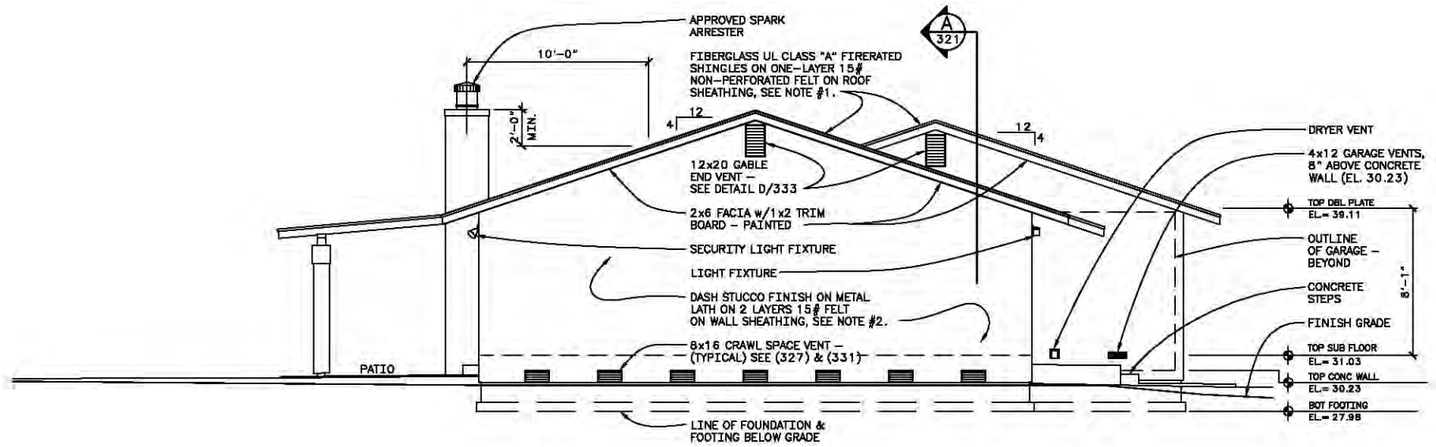
PRJ-STA-SEQ
SHEET 1 OF 1

DATE AND TIME PLOTTED
Not Plotted
PLOTTED BY
Not Plotted

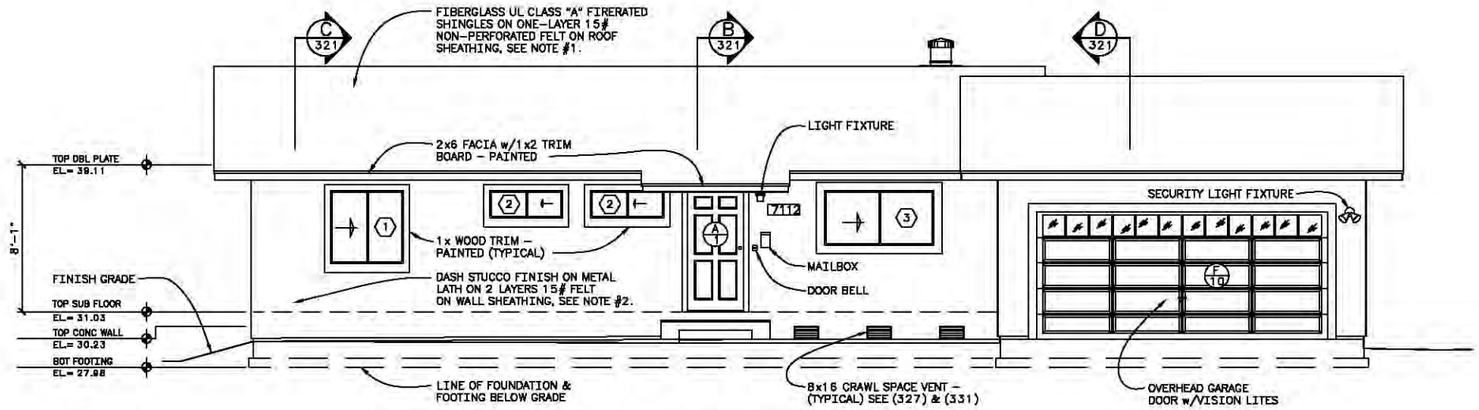
CAD SYSTEM
AUTOCAD
CAD FILENAME
UNKNOWN

2011-01-26

FIGURE 53



EAST ELEVATION
1/4"=1'-0"



NORTH ELEVATION
1/4"=1'-0"

1 0 5 10 15
SCALE OF FEET

GENERAL NOTES

1. ROOF SHEATHING:
15/32" APA RATED SHEATHING, 32/16, EXPOSURE 1, NAILED TO TRUSSES w/8d COMMON NAILS @ 6" O.C. AT EDGES AND 12" O.C. AT INTERMEDIATE NAILING.

2. WALL SHEATHING:
15/32" APA RATED SHEATHING, 32/16, EXPOSURE 1, NAILED TO STUDS w/8d COMMON NAILS @ 6" O.C. AT EDGES AND 12" O.C. AT INTERMEDIATE NAILING.

3. CRAWL SPACE VENTILATION HAS BEEN CALCULATED AS PER 1994 UBC, SECTION 2317.7, WHICH STATES THAT, "1 SQUARE FOOT OF VENTILATION FOR EVERY 150 SQUARE FOOT OF UNDER-FLOOR AREA IS REQUIRED" SEE DRAWING (327) FOR LOCATIONS.

4. EXTERIOR SECURITY LIGHTS TO BE LOCATED AT 7'-0" ABOVE SUBFLOOR.

5. HOUSE TO BE PAINTED WITH 'SINCLAIR' "DUSTY TAUPE".

6. ELEVATIONS MAY CHANGE BASED ON FIELD SURVEY.

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DESIGNED
DRAWN
CHECKED
TECH. APPR. NAME, PROF. ASSOC.
ADMIN. APPROVAL NAME TITLE
BILLINGS, MONTANA 2010-08-09

ARCHITECTURAL BUILDING ELEVATIONS

PRJ-STA-SEQ
SHEET 1 OF 1

FIGURE 54

DATE AND TIME PLOTTED
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