

### WINGWALLS FOR CONCRETE HEADWALLS

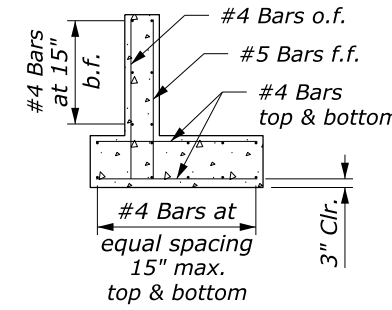
#### DIMENSIONS, REINFORCING STEEL AND CONCRETE TABLE OF QUANTITIES

D INCH	H FEET	0° WINGWALL SKEW			15° WINGWALL SKEW			30° WINGWALL SKEW			45° WINGWALL SKEW			60° WINGWALL SKEW		
		W FEET	CONC. CUYD	STEEL LB	W FEET	CONC. CUYD	STEEL LB	W FEET	CONC. CUYD	STEEL LB	W FEET	CONC. CUYD	STEEL LB	W FEET	CONC. CUYD	STEEL LB
48	5.00	6.00	2.81	178	6.00	2.78	178	6.00	2.76	178	6.00	2.74	178	6.00	2.73	178
54	5.25	6.00	2.86	180	6.00	2.82	180	6.00	2.80	180	6.00	2.78	180	6.75	3.06	202
60	5.50	6.25	2.90	181	6.00	2.86	181	6.00	2.84	181	6.00	2.82	181	7.50	3.39	224
66	5.75	7.00	2.94	183	6.00	2.90	183	6.00	2.87	183	6.00	2.85	183	8.25	3.74	241
72	6.00	7.50	2.98	185	6.00	2.94	185	6.00	2.91	185	6.50	3.09	202	9.00	4.09	263
78	6.25	8.25	3.02	186	6.00	2.98	186	6.00	2.95	186	7.00	3.34	213	9.75	4.45	285
84	6.50	8.75	3.06	188	6.00	3.02	188	6.25	3.09	197	7.50	3.59	232	10.50	4.81	311
90	6.75	9.50	3.11	190	6.00	3.06	190	6.50	3.24	207	8.00	3.84	246	11.25	5.18	329
96	7.00	10.00	3.15	191	6.25	3.21	200	7.00	3.49	218	8.50	4.10	260	12.00	5.56	350

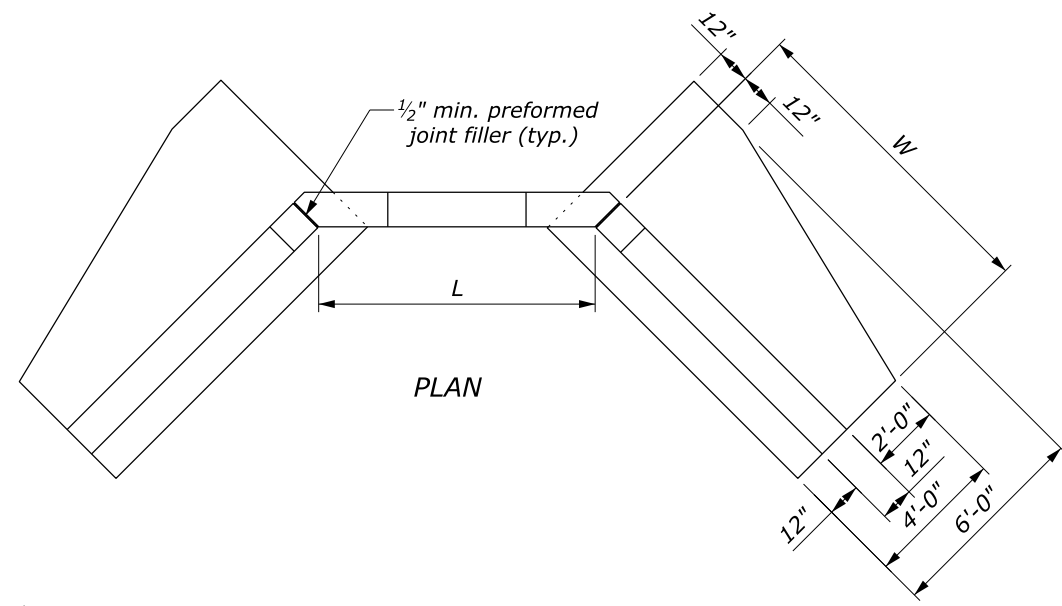
WINGWALL	PIPE SKEW			
	0°	15°	30°	45°
①	45°	45°	60°	60°
②	45°	30°	15°	0°
③	45°	30°	15°	0°
④	45°	45°	60°	60°

**NOTE:**

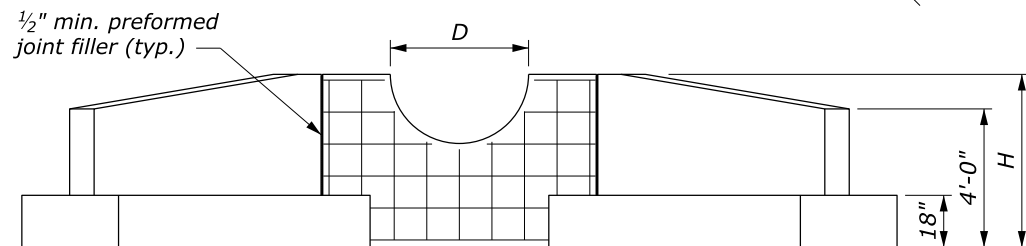
- Chamfer all exposed edges  $\frac{3}{4}$  inch and finish all exposed surfaces with a Class 1 ordinary finish.
- Reinforcing steel clearance is 2 inches unless otherwise noted.
- For skew angles shown in table, the length W and quantities for wingwalls are computed for a 1V:1.5H side slope. For 1V:2H or 1V:2.5H slopes compute length W with the following equation:  
 $W = D/2 \times \text{slope} \times \text{secant (wingwall skew angle)}$   
 Minimum W not less than 6 feet.
- Quantities shown in table are for one wingwall only. For lengths W not shown in table, approximate the quantities by multiplying the quantities for 0° skew and a given height H by the factor:  $1 + [(W-6.0) \times 0.14]$ .
- See Standards 601-1 and 601-2 for headwall and slope paving dimensions.
- Final quantities will be determined by using the tables on this drawing.
- Do not order materials until the length, skew angle, and slope level in the field have been approved.



SECTION A-A

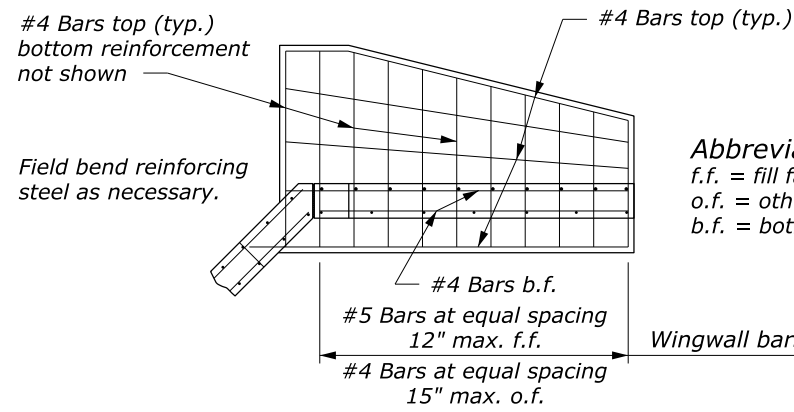


PLAN

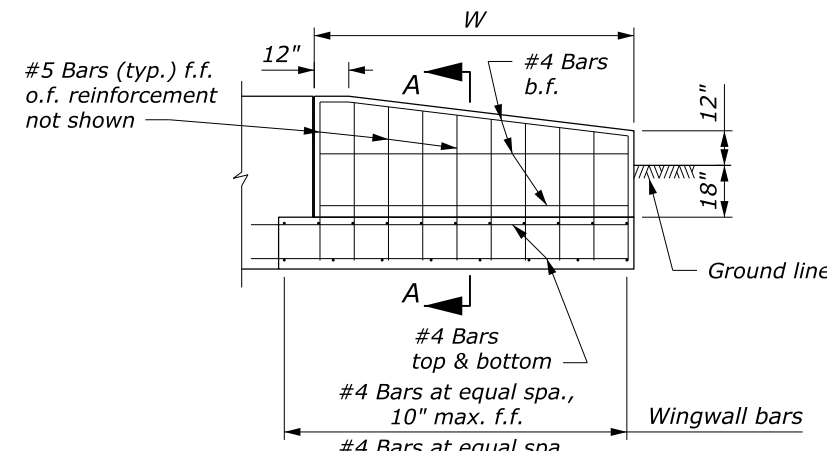


ELEVATION

**HEADWALL AND WINGWALL**



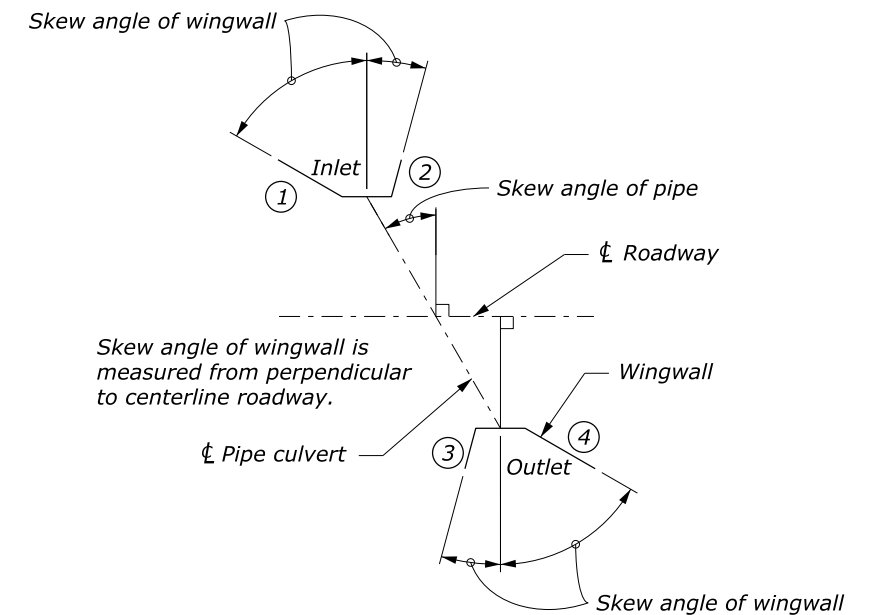
PLAN



ELEVATION

**TYPICAL WINGWALL**

Abbreviations:  
 f.f. = fill face  
 o.f. = other face  
 b.f. = both faces



**WINGWALL LAYOUT**

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA  
 OFFICE OF FEDERAL LANDS HIGHWAY

**WINGWALLS FOR  
 CONCRETE HEADWALLS**

FLH STANDARD  
 601-3

SPECIFICATION  
 FP-24, FP-14

APPROVED FOR USE  
 2/2024

### WINGWALLS FOR CONCRETE HEADWALLS

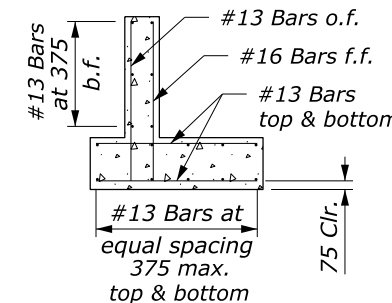
#### DIMENSIONS, REINFORCING STEEL AND CONCRETE TABLE OF QUANTITIES

D	H m	0° WINGWALL SKEW			15° WINGWALL SKEW			30° WINGWALL SKEW			45° WINGWALL SKEW			60° WINGWALL SKEW		
		W m	CONC. m3	STEEL kg	W m	CONC. m3	STEEL kg	W m	CONC. m3	STEEL kg	W m	CONC. m3	STEEL kg	W m	CONC. m3	STEEL kg
1200	1.500	1.8	2.05	80	1.8	2.03	80	1.8	2.01	80	1.8	2.00	80	1.8	1.99	80
1350	1.575	1.8	2.08	80	1.8	2.06	80	1.8	2.04	80	1.8	2.03	80	2.1	2.30	92
1500	1.650	1.8	2.11	81	1.8	2.09	81	1.8	2.07	81	1.8	2.05	81	2.3	2.52	101
1650	1.725	1.8	2.14	82	1.8	2.12	82	1.8	2.10	82	1.8	2.08	82	2.5	2.75	108
1800	1.800	1.8	2.17	82	1.8	2.15	82	1.8	2.12	82	2.0	2.30	92	2.7	2.98	117
1950	1.875	1.8	2.20	83	1.8	2.17	83	1.8	2.15	83	2.1	2.43	95	3.0	3.32	130
2100	1.950	1.8	2.23	84	1.8	2.20	84	1.9	2.28	88	2.3	2.66	104	3.2	3.56	140
2250	2.025	1.8	2.26	85	1.8	2.23	85	2.0	2.41	95	2.4	2.80	110	3.4	3.80	147
2400	2.100	1.8	2.30	85	1.9	2.36	90	2.1	2.54	97	2.6	3.04	117	3.6	4.05	156

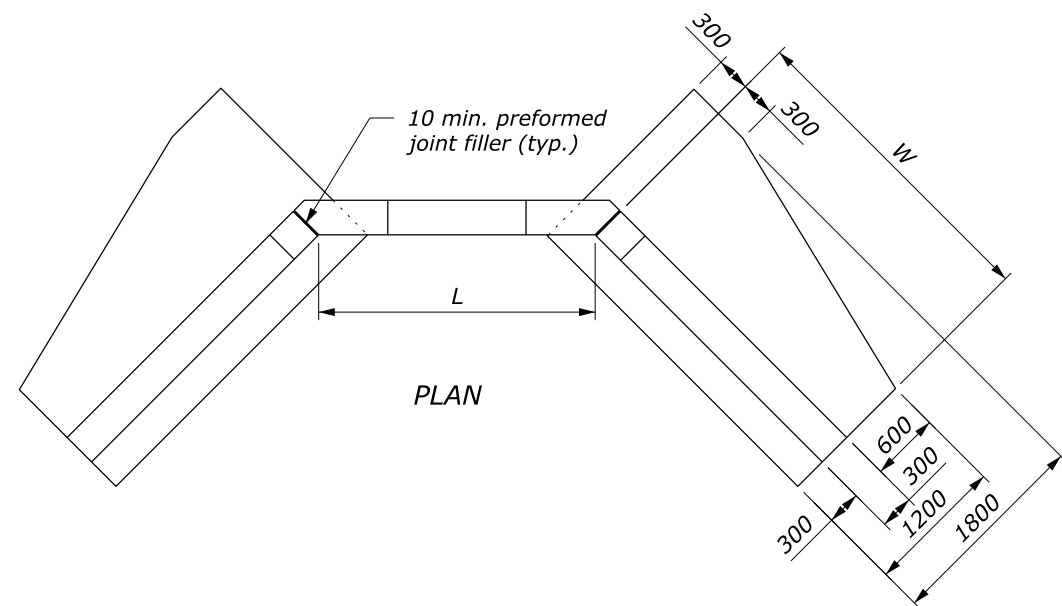
WINGWALL	PIPE SKEW			
	0°	15°	30°	45°
①	45°	45°	60°	60°
②	45°	30°	15°	0°
③	45°	30°	15°	0°
④	45°	45°	60°	60°

**NOTE:**

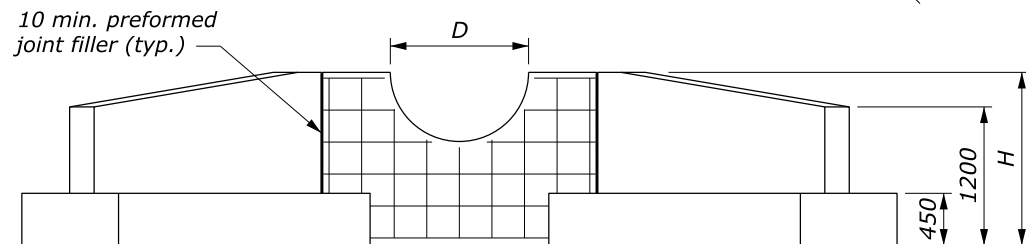
1. Chamfer all exposed edges 20 mm and finish all exposed surfaces with a Class 1 ordinary finish.
2. Reinforcing steel clearance is 50 mm unless otherwise noted.
3. For skew angles shown in table, the length W and quantities for wingwalls are computed for a 1V:1.5H side slope. For 1V:2H or 1V:2.5H slopes compute length W with the following equation:  
 $W = D/2 \times \text{slope} \times \text{secant (wingwall skew angle)}$   
 Minimum W not less than 1.8 meters.
4. Quantities shown in table are for one wingwall only. For lengths W not shown in table, approximate the quantities by multiplying the quantities for 0° skew and a given height H by the factor:  $1 + [(W-1.8) \times 0.46]$ .
5. See Standards M601-1 and M601-2 for headwall and slope paving dimensions.
6. Final quantities will be determined by using the tables on this drawing.
7. Do not order materials until the length, skew angle, and slope level in the field have been approved.



SECTION A-A

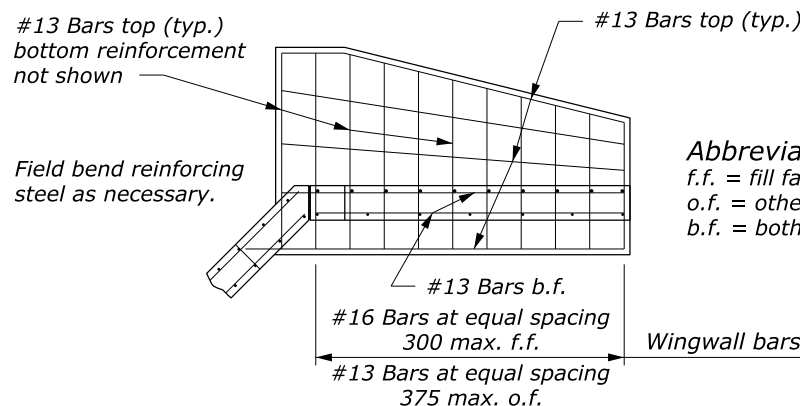


PLAN

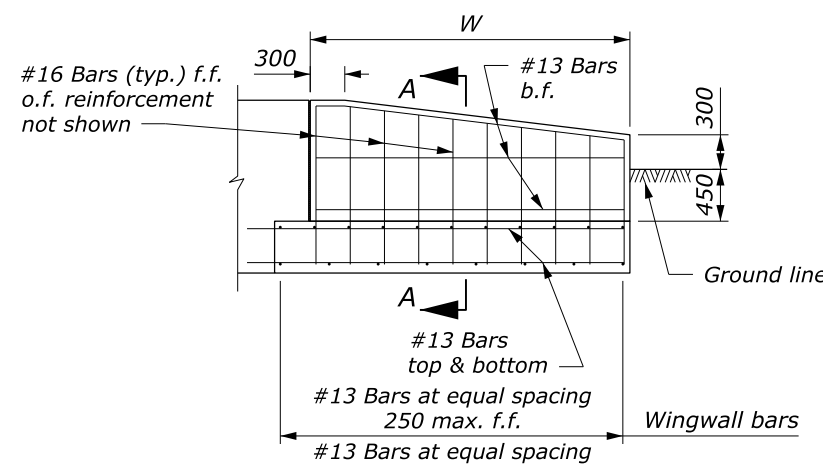


ELEVATION

**HEADWALL AND WINGWALL**



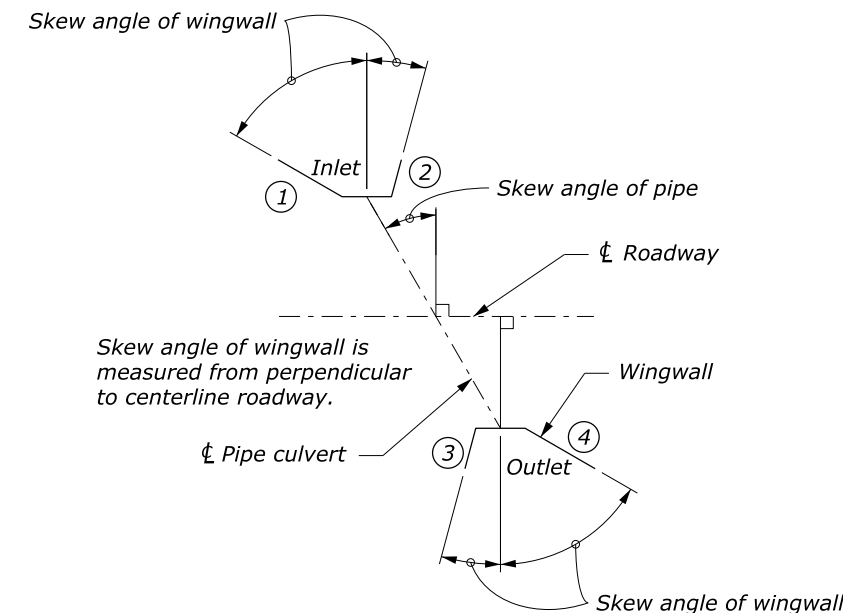
PLAN



ELEVATION

**TYPICAL WINGWALL**

Abbreviations:  
 f.f. = fill face  
 o.f. = other face  
 b.f. = both faces



**WINGWALL LAYOUT**

This drawing contains **Metric** units of measure. Dimensions without units are millimeters.

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION, FHWA  
 OFFICE OF FEDERAL LANDS HIGHWAY

**WINGWALLS FOR CONCRETE HEADWALLS**

FLH STANDARD M601-3

SPECIFICATION FP-24, FP-14

APPROVED FOR USE 2/2024