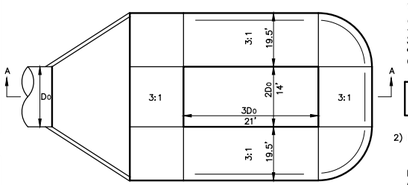
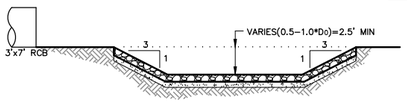
RIP-RAP GRADATIONS	
18" THICKNESS OF RIP-RAP	
SIEVE SIZE SQUARE MESH	PERCENT PASSING
21 INCH	100
18 INCH	65 – 100
12 INCH	35 – 65
8 INCH	15 – 40
6 INCH	5 – 25
4 INCH	0 – 15

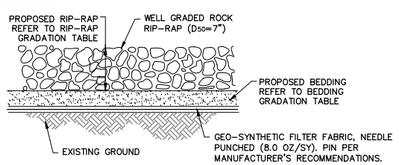
BEDDING GRADATIONS	
6" THICKNESS OF BEDDING	
SIEVE SIZE SQUARE MESH	PERCENT PASSING
3 INCH	100
1–1/2 INCH	55 – 100
3/4 INCH	25 – 60
3/8 INCH	5 – 30
No. 4	0 – 10



PLAN



SECTION A–A



FOR STA 0+00 LINE "ST–1"

1 SCOUR HOLE DETAIL

NOT TO SCALE

SOLVE EQUATIONS 1 & 2 FOR D50 USE THE LARGER OF THE TWO TO DETERMINE GRADATION TABLE

1) $D_{50} = \frac{\gamma_W * V_{all}^2}{2G(\gamma_S - \gamma_W)C^2}$ $D_{50} = \frac{62.4 \times 121.0}{64.4 \times 92.6 \times 0.86^2}$

$D_{50} = \frac{3261.83}{4410.56} = 0.74'$

V_{all}=7.23 fps Q_{100}=193.67 cfs D_{50}=8.88"
C=0.86 (HIGH TURBULENCE), 1.2 (LOW TURBULENCE)
γ_W=62.4 lb/cf
γ_S=155 lb/cf
G=32.2 ft/s²

RESULTS
D50=9"

2) $D_{50} = \frac{C}{T_W}\left(\frac{Q}{D_0}\right)^{1/3}$ $D_{50} = \frac{0.0082}{3'}\left(\frac{193.67}{7'}\right)^{1.333} = 0.229'$

D0=DIAMETER OR WIDTH OF STORM DRAIN
Q=STORM DRAIN DISCHARGE CFS = 193.67 cfs
Tw=TAILWATER DEPTH ABOVE DRAIN INVERT ft
C=0.0125 FOR 0.5D0–DEEP PREFORMED SCOUR HOLE
=0.0082 FOR 1.0D0–DEEP PREFORMED SCOUR HOLE

RESULTS
D50=3"

DRY STONE RIP–RAP SPECIFICATIONS & GRADING

THE FOLLOWING SPECIFICATIONS AND GRADATIONS ARE MINIMUMS TO BE USED IN CONSTRUCTION.

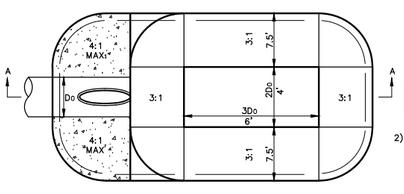
1. USE FILED OR QUARRY DRY STONE RIP–RAP.
2. ALL STONES SHALL HAVE A MINIMUM UNIT WEIGHT OF 155 lb/cf. QUARRY DATA SHEETS FOR RIP–RAP TO BE APPROVED PRIOR TO INSTALLATION.
3. MINIMUM BED DEPTH OF RIP–RAP SHALL BE 6".
4. STONES SHALL BE PLACED IN A SINGLE LAYER WITH CLOSED JOINTS. THE UPRIGHT AXIS OF THE SONTES SHALL BE NEARLY PERPENDICULAR TO THE EMBANKMENT SLOPE. THE COURSES SHALL BE PLACED FROM THE BOTTOM OF THE EMBANKMENT UPWARDLY, WITH LARGER STONES BEING PLACED IN THE LOWER COURSES. OPEN JOINTS SHALL BE FILLED WITH SPALLS. STONES THAT PROJECT MORE THAN THE ALLOWABLE AMOUNT IN THE FINISHED WORK SHALL BE REPLACED, EMBEDDED DEEPER, OR CHIPPED.
5. RIP RAP SHALL BE STOCKPILED AND APPROVED PRIOR TO INSTALLATION.

NOTE:

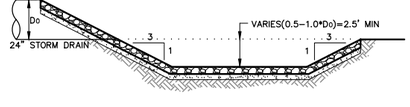
1. EQUATION 1 CAME FROM THE US ARMY ENGINEERS WATERWAYS EXPERIMENT STATION, CE, HYDRAULIC DESIGN CRITERIA, SHEET 712–1, 1970
2. EQUATION 2 CAME FROM THE US ARMY ENGINEERS WATERWAYS EXPERIMENT STATION, CE, HYDRAULIC DESIGN CRITERIA, SHEET 722–7, 1970

RIP-RAP GRADATIONS	
24" THICKNESS OF RIP–RAP	
SIEVE SIZE SQUARE MESH	PERCENT PASSING
30 INCH	100
24 INCH	65 – 100
18 INCH	45 – 75
12 INCH	25 – 50
8 INCH	10 – 30
6 INCH	0 – 15

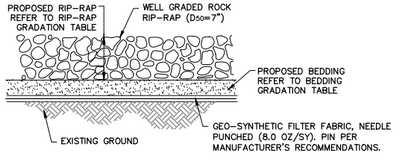
BEDDING GRADATIONS	
6" THICKNESS OF BEDDING	
SIEVE SIZE SQUARE MESH	PERCENT PASSING
3 INCH	100
1–1/2 INCH	55 – 100
3/4 INCH	25 – 60
3/8 INCH	5 – 30
No. 4	0 – 10



PLAN



SECTION A–A



FOR STA 0+00 LINE "ST–15"

2 SCOUR HOLE DETAIL

NOT TO SCALE

SOLVE EQUATIONS 1 & 2 FOR D50 USE THE LARGER OF THE TWO TO DETERMINE GRADATION TABLE

1) $D_{50} = \frac{\gamma_W * V_{all}^2}{2G(\gamma_S - \gamma_W)C^2}$ $D_{50} = \frac{62.4 \times 83.54}{64.4 \times 92.6 \times 0.86^2}$

$D_{50} = \frac{5212.90}{4410.56} = 1.18'$

V_{all}=9.14 fps Q_{100}=94.00 cfs D_{50}=14.16"
C=0.86 (HIGH TURBULENCE), 1.2 (LOW TURBULENCE)
γ_W=62.4 lb/cf
γ_S=155 lb/cf
G=32.2 ft/s²

RESULTS
D50=15"

2) $D_{50} = \frac{C}{T_W}\left(\frac{Q}{D_0}\right)^{1/3}$ $D_{50} = \frac{0.0082}{2'}\left(\frac{94.00}{2'}\right)^{1.333} = 0.695'$

D0=DIAMETER OR WIDTH OF STORM DRAIN
Q=STORM DRAIN DISCHARGE CFS = 94.00 cfs
Tw=TAILWATER DEPTH ABOVE DRAIN INVERT ft
C=0.0125 FOR 0.5D0–DEEP PREFORMED SCOUR HOLE
=0.0082 FOR 1.0D0–DEEP PREFORMED SCOUR HOLE

RESULTS
D50=8"

DRY STONE RIP–RAP SPECIFICATIONS & GRADING

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2. ALL STONES SHALL HAVE A MINIMUM UNIT WEIGHT OF 155 lb/cf. QUARRY DATA SHEETS FOR RIP–RAP TO BE APPROVED PRIOR TO INSTALLATION.
3. MINIMUM BED DEPTH OF RIP–RAP SHALL BE 6".
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NOTE:

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2. EQUATION 2 CAME FROM THE US ARMY ENGINEERS WATERWAYS EXPERIMENT STATION, CE, HYDRAULIC DESIGN CRITERIA, SHEET 722–7, 1970

RECORD DRAWING

THE SIGNED AND SEALED CONSTRUCTION DOCUMENT HAS BEEN REVISED TO REFLECT CONSTRUCTION RECORDS MAINTAINED AND PROVIDED BY THE CONTRACTOR FOR THIS PROJECT. THE INFORMATION SHOWN ON THIS RECORD DRAWING, WHICH WAS PROVIDED BY THE CONTRACTOR, OR OTHERS NOT ASSOCIATED WITH THE DESIGN ENGINEER, CANNOT BE VERIFIED FOR ACCURACY OR COMPLETENESS. PACHECO KOCH SHALL ASSUME NO LIABILITY FOR ANY CHANGES MADE DURING CONSTRUCTION THAT WERE NOT SPECIFICALLY APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION. THE SEALED CONSTRUCTION DRAWINGS ARE ON FILE AT THE OFFICES OF PACHECO KOCH.

ATTESTED BY:

SIGNATURE: _____

ENGINEER OF RECORD: CHET LEUDERS, P.E.

CONTRACTOR: MILLER–VALENTINE CONSTRUCTION

DATE REVISED: 06/08/2017

NO.	DATE	REVISION
5	06/09/2017	RECORD DRAWINGS
4	09/19/2016	REVISED DETAIL
3	08/25/2016	ADDED SHEET

Pacheco Koch
7557 RAMBLER ROAD, SUITE 1400
DALLAS, TX 75231 972.235.3031
TX REG. ENGINEERING FIRM F–14439
TX REG. SURVEYING FIRM LS–10193805

EAST DETENTION POND STORM SEWER DETAILS

ROCKWALL MANUFACTURING FACILITY

LOT 1, BLOCK A, ROCKWALL TECHNOLOGY PARK, PHASE IV

CITY OF ROCKWALL, ROCKWALL COUNTY, TEXAS

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
CTL	RHB	JULY 2016	N.T.S.			C8.5

Rockwall Manufacturing Facility

Case Number: SP2016-12