

Appendix E
Civil Design Calculations

Option 1
Quantity Calculations

By: M. Haapala
Date: February 12, 2013

Earthwork

Total Cut

FG compared to OG for North Ext
Cut from surface subtraction
1457027 CY

FG compared to OG near Terminals 2 & 3
Cut from surface subtraction
0 CY

cut required for armor rock placement - assume all dredging
162390.6667 CY

Total Cut 1619417.667 CY

Dredging

assumed to be total cut less excavation qty
920740.6667 CY

Excavation

OG compared to Dummy excavation surface
Cut from surface subtraction
698677 CY

Salvage Armor Rock

Armor rock area = 67722 SF
assumed salvageable depth: 4 FT
270888 CF
10032.88889 CY

Armor Rock

Armor Rock area = 730758 SF
depth: 6 FT
4384548 CF
162390.6667 CY
minus salvaged qty
152357.7778 CY

Option 1

Quantity Calculations

By: M. Haapala

Date: February 12, 2013

Backlands Paving

Pad Area= 1376583 SF
31.60 AC

Type II Classified Fill (21")

depth: 21 inches
2409020.25 CF
89222.97222 CY

Leveling Course (8")

depth: 8 inches
917722 CF
33989.7037 CY

AC Pavement, Class A (5")

depth: 5 inches
573576.25 CF

assume 150lb/CF

43018.21875 TON

AC Pavement, Class E (2")

depth: 2 inches
229430.5 CF

assume 150lb/CF

17207.2875 TON

Option 1

Estimate of Quantities

Item	Raw Quantity	Plan Quantity
Dredging	920740.6667 CY	967000 CY
Excavation	698677 CY	734000 CY
Salvage Armor Rock	10033 CY	11000 CY
Armor Rock	152358 CY	160000 CY
Backlands Paving		
Type II Classified Fill (21")	89223 CY	93700 CY
Leveling Course (8")	33990 CY	35700 CY
AC Pavement, Class A (5")	43018 TON	45200 TON
AC Pavement, Class E (2")	17207 TON	18100 TON

Note

Raw quantity increased by 5% to account for error in available original ground surface data.

Option 5 Quantity Calculations

By: M. Haapala
Date: February 12, 2013

Earthwork

Total Cut

FG compared to OG for North Ext
Cut from surface subtraction
1921332 CY

FG compared to OG near Terminals 2 & 3
Cut from surface subtraction
271126 CY

Cut required for armor rock placement - assume all dredging
128866.6667 CY

Total Cut 2321324.667 CY

Dredging

assumed to be total cut less excavation qty
1414199.667 CY

Excavation

OG compared to Dummy excavation surface
Cut from surface subtraction
907125 CY

Salvage Armor Rock

Armor rock area = 99270 SF
assumed salvageable depth: 4 FT
397080 CF
14706.66667 CY

Armor Rock

Armor Rock area = 579900 SF
depth: 6 FT
3479400 CF
128866.6667 CY
minus salvaged qty
114160 CY

Option 5 Quantity Calculations

By: M. Haapala

Date: February 12, 2013

Backlands Paving

Pad Area= 1213120 SF
27.85 AC

Type II Classified Fill (21")

depth: 21 inches
2122960 CF
78628.14815 CY

Leveling Course (8")

depth: 8 inches
808746.6667 CF
29953.58025 CY

AC Pavement, Class A (5")

depth: 5 inches
505466.6667 CF

assume 150lb/CF

37910 TON

AC Pavement, Class E (2")

depth: 2 inches
202186.6667 CF

assume 150lb/CF

15164 TON

Option 5

Estimate of Quantities

Item	Raw Quantity	Plan Quantity
Dredging	1414199.667 CY	1485000 CY
Excavation	907125 CY	952000 CY
Salvage Armor Rock	14707 CY	
Armor Rock	114160 CY	119900 CY
Backlands Paving		
Type II Classified Fill (21")	78628 CY	82600 CY
Leveling Course (8")	29954 CY	31500 CY
AC Pavement, Class A (5")	37910 TON	39800 TON
AC Pavement, Class E (2")	15164 TON	15900 TON

Note

Raw quantity increased by 5% to account for error in available original ground surface data.

Option 5H
Quantity Calculations

By: M. Haapala
Date: February 12, 2013

Earthwork

Total Cut

FG compared to OG for North Ext
Cut from surface subtraction
1573015 CY

FG compared to OG near Terminals 2 & 3
Cut from surface subtraction
63773 CY

cut required for armor rock placement - assume all dredging
181155.5556 CY

Total Cut 1817943.556 CY

Dredging

assumed to be total cut less excavation qty
1115596.556 CY

Excavation

OG compared to Dummy excavation surface
Cut from surface subtraction
702347 CY

Salvage Armor Rock

Armor rock area = 99270 SF
assumed salvageable depth: 4 FT
397080 CF
14706.66667 CY

Armor Rock

Armor Rock area = 815200 SF
depth: 6 FT
4891200 CF
181155.5556 CY
minus salvaged qty
166448.8889 CY

Option 5H
Quantity Calculations

By: M. Haapala
Date: February 12, 2013

Backlands Paving

Pad Area= 1400546 SF
32.15 AC

Type II Classified Fill (21")

depth: 21 inches
2450955.5 CF
90776.12963 CY

Leveling Course (8")

depth: 8 inches
933697.3333 CF
34581.38272 CY

AC Pavement, Class A (5")

depth: 5 inches
583560.8333 CF

assume 150lb/CF

43767.0625 TON

AC Pavement, Class E (2")

depth: 2 inches
233424.3333 CF

assume 150lb/CF

17506.825 TON

Option 5H

Estimate of Quantities

Item	Raw Quantity	Plan Quantity
Dredging	1115597 CY	1171000 CY
Excavation	702347 CY	737000 CY
Salvage Armor Rock	14707 CY	
Armor Rock	166449 CY	174800 CY
Backlands Paving		
Type II Classified Fill (21")	90776 CY	95300 CY
Leveling Course (8")	34581 CY	36300 CY
AC Pavement, Class A (5")	43767 TON	46000 TON
AC Pavement, Class E (2")	17507 TON	18400 TON

Note

Raw quantity increased by 5% to account for error in available surface data.