WALK WAY CHANNEL DESIGN CONT.

C12x 20.7, 50 KSI, $S_x = 21.5\ IN^3$

$F_b = 0.6\,F_y = 0.60 \times 50\,KSI = 30\,KSI = 30000\ PSI$

$RM = SF_b = M \quad RM = \frac{21.5\ IN^3 \times 30000\ PSI}{12} = 53750$ FOOT LBS $= 645000$ IN-LB

$M = \frac{WL}{8}$, $L = 22'\text{-}0''$

THEN $W = \frac{8M}{L}$ OR $W = \frac{8 \times 53750\ \text{FOOT LBS}}{22} = 19545.45 \rightarrow 19545$ LBS

LOAD $W = \frac{19545\ LBS}{22'} = 888$ #/LF ON BEAM

CHECK DEFLECTION → USE $\frac{L}{360} = \frac{22' \times 12}{360} = 0.73''$

C ~~10~~12 x 20.7 $I_x = 129\ IN^4$, $S_x = 21.5\ IN^3$, $A = 6.09\ IN^2$

$M = F_b \times S = 30KSI \times 21.5\ IN^3 = 645$ K-IN

$P = \frac{4M}{L} = \frac{4 \times 53750\ \text{FT-LBS}}{22'} = 9773$ LBS $= 9.8K$

$0.73'' = \frac{PL^3}{48EI}$ OR $I = \frac{(9.8K)(22' \times 12)^3}{48 \times 29000 \times 0.73} = \frac{180317491}{1016160} = 177.44$

$I = 177.44\ IN^4 > 129\ IN^4$ → NO GOOD

$\boxed{\rightarrow \text{C 12x 20.7 NO GOOD}}$

$\boxed{\text{TRY MC 12x31, } S_x = 33.8\ IN^3, \underline{I_x = 203}}$

$M = F_b \times S = 30KSI \times 33.8\ IN^3 = 1014$ K-IN

RESURGAM. CITY OF PORTLAND, MAINE
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 05/30/13