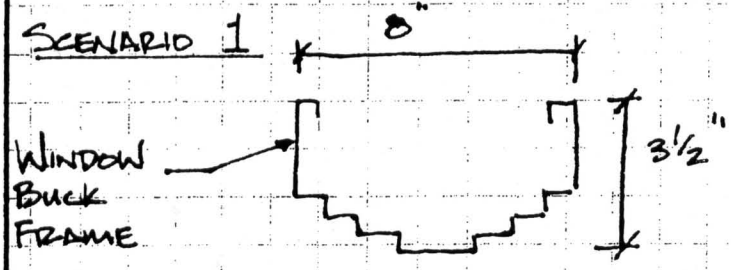
ARW Engineers

Project No. 03073 Sheet No. _____

Project BOMAN KEMP STEEL WINDOW

Prepared By JLA Date 4/3/03

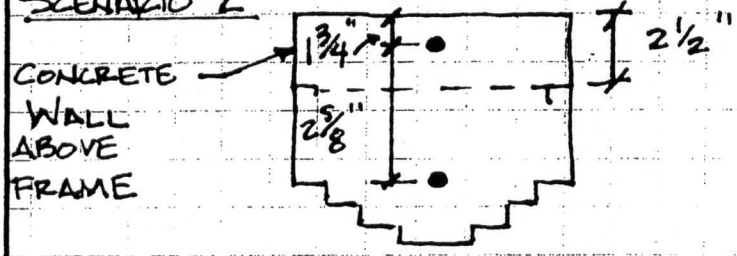
SCENARIO 1



NO REINFORCING

CAPACITY = 540 #/ft

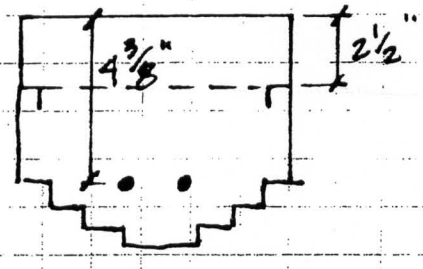
SCENARIO 2



(2) #4 BARS

CAPACITY = 1070 #/ft

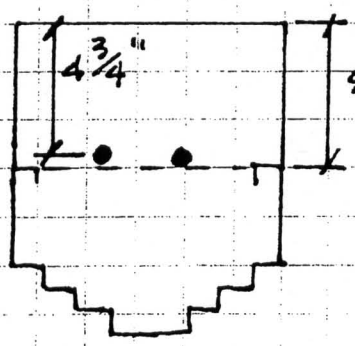
SCENARIO 3



(2) #4 BARS SEPARATED BY 1" MIN.

CAPACITY = 2093 #/ft

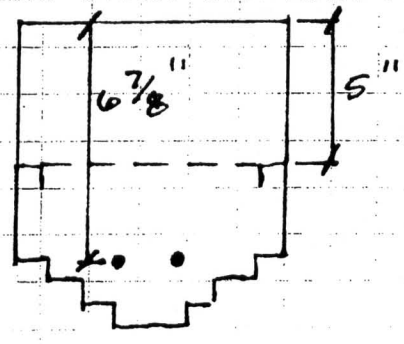
SCENARIO 4



(2) #4 BARS SEPARATED BY 1" MIN.

CAPACITY = 2301 #/ft

SCENARIO 5



(2) #4 BARS SEPARATED BY 1" MIN.

CAPACITY = 3475 #/ft

LICENSED PROFESSIONAL ENGINEER
Jeremy L. Achter
No. 353467
STATE OF UTAH

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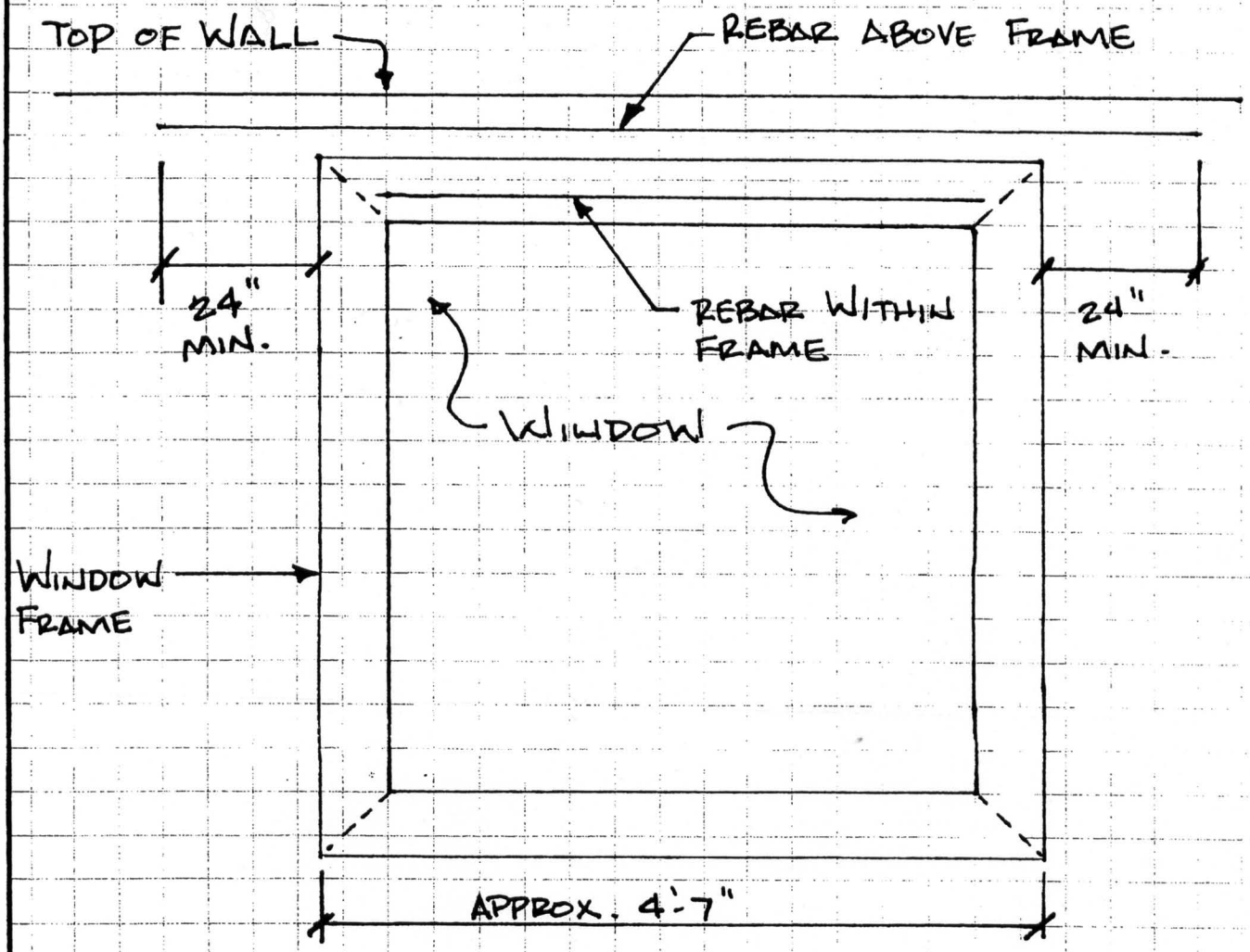
Prepared By JLA Date 4/3/03



- ANY REINFORCING BAR ABOVE THE FRAME, SHALL EXTEND 24" MIN. BEYOND WINDOW FRAME.

- ANY REINFORCING BAR WITHIN THE FRAME SHALL TERMINATE AT THE VERTICAL FRAME MEMBER INTERSECTION.

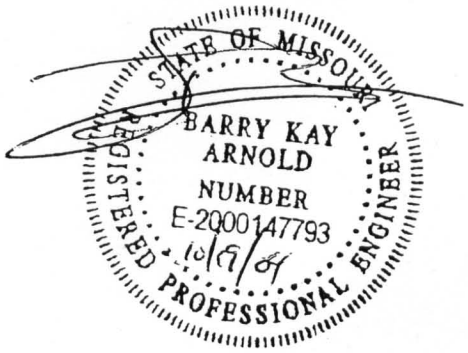
LICENSED PROFESSIONAL ENGINEER
Jeremy L. Achtel
No. 353467
STATE OF UTAH

STRUCTURAL CALCULATIONS

FOR

Boman and Kemp
Window Well

56" x 36" x 6'0"
Soil Pressure
45 psf/ft

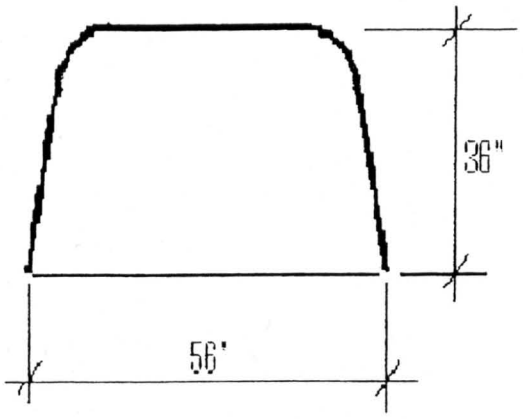


Prepared by

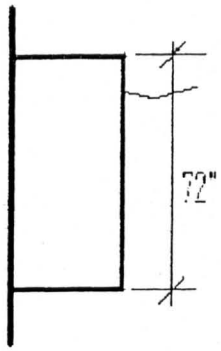
ARW Engineers

1594 West Park Circle
Ogden, UT 84404

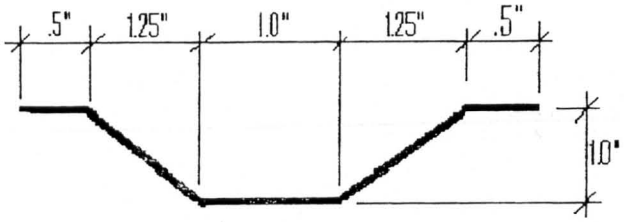
WINDOW WELL 56" x 36" x 6"-0"



Window Well Section

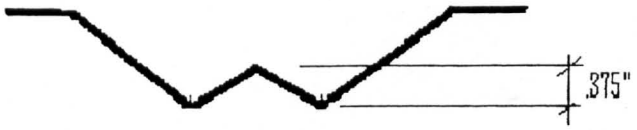


Window Well Section



Partial Section At Straight Elements

Section Properties	12 " width
thickness	$t_s := .043$
mom of inertia	$I_s := .088$
radius of gyr	$r := .384$
area	$a_s := .5965$
section mod	$s_s := .176$



Partial Section at Curved Elements

Section Properties	12 " width
thickness	$t_c := .043$
mom of inertia	$I_c := .0747$
radius of gyr	$r_c := .346$
area	$a_c := .625$
section mod	$s_c := .1436$

Material Properties

ASTM A572

$F_y := 42$ ksi

Stress Analysis for Soil Load of 45 psf/ft (Maximum Soil Load 270 psf)

Section forces from finite element analysis

Maximum forces in straight section $M_{z2} := 0.141$ k-ft $Ax2 := 0.60$ k

$f_{b2} := \frac{M_{z2} \cdot 12}{s_s}$ $f_{b2} = 9.614$ $F_b := .667 \cdot F_y$ $F_b = 28.014$

let $kl := 1.0 \cdot 24$ length between inflection points

$\frac{kl}{r} = 62.5$ $c_c := \sqrt{2 \cdot \pi^2 \cdot \frac{29000}{42}}$ $c_c = 116.745$ $\frac{\frac{kl}{r}}{c_c} = 0.535$

$Fa := .384 \cdot 42$ $Fa = 16.128$ $f_a := \frac{Ax2}{a_s}$ $f_a = 1.006$

Combined stresses $csr := \frac{f_a}{Fa} + \frac{f_{b2}}{F_b}$ $csr = 0.406$

Maximum soil load capacity Straight section $Maxso2 := \frac{1.0}{csr} \cdot 270$ $Maxso2 = 665.778$

Check Curved Segment

Section forces from finite element analysis with snow load of 100psf

Maximum forces in segment M23 $M_{zc2} := .077$ $A_{xc2} := 0.69$

$f_{ac} := \frac{A_{xc2}}{a_c}$ $f_{ac} = 1.104$

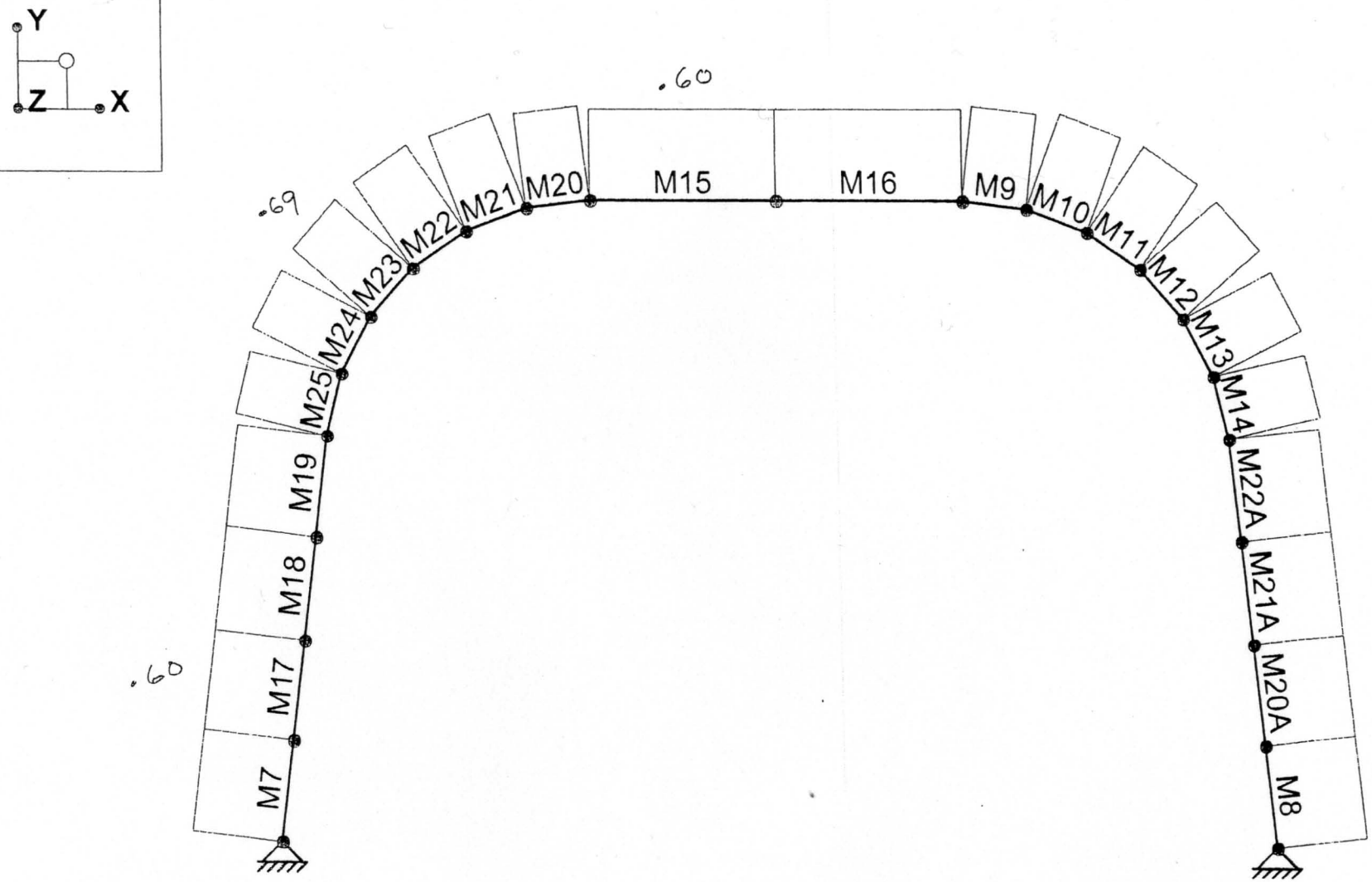
From AISI Handbook Allowable axial stress use Fy/2 when d/r < 294

$d := 26$ $\frac{d}{r_c} = 75.145$ Therefore use $F_{ac} := \frac{F_y}{2}$

$f_{bc} := \frac{M_{zc2} \cdot 12}{s_c}$ $f_{bc} = 6.435$

Combined stresses $csr_c := \frac{f_{ac}}{F_{ac}} + \frac{f_{bc}}{F_b}$ $csr_c = 0.282$

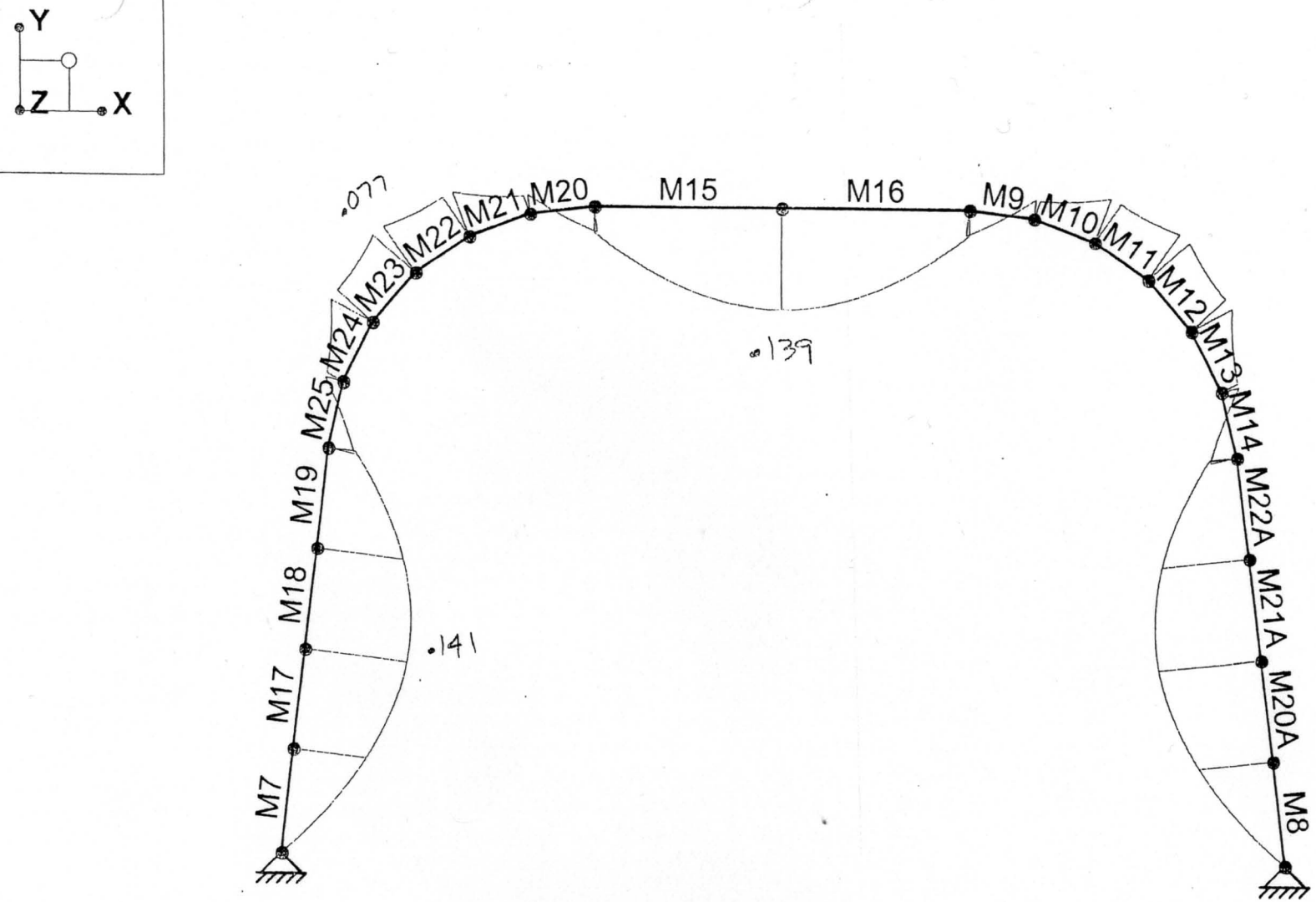
Maximum soil load capacity Curved section $Maxso1 := \frac{1.0}{csr_c} \cdot 270$ $Maxso1 = 956.559$



Results for LC 1, SOIL
Member Axial Forces (k)

SOIL LOAD 270 lb/ft²

ARW Engineers		
O. Kent Rich		Oct 5, 2004 at 2:09 PM
		B&K WELL 56X36.r3d



Results for LC 1, SOIL
Member z Bending Moments (k-ft)

SOIL LOAD 270 lb/ft²

ARW Engineers		
O. Kent Rich		Oct 5, 2004 at 2:09 PM
		B&K WELL 56X36.r3d