

**PROYECTO: INSTITUCIÓN EDUCATIVA
BARRIO OBRERO, CLL 17 N° 3N-102**
dye16-2253



**MEMORIAS DE ANÁLISIS
Y DISEÑO ESTRUCTURAL**

BOGOTÁ D.C., 18 NOVIEMBRE DE 2016

1. DESCRIPCIÓN DEL PROYECTO

1.1. INTRODUCCIÓN

El presente documento contiene las memorias de análisis y diseño estructural correspondiente al proyecto INSTITUCIÓN EDUCATIVA BARRIO OBRERO ubicado CLL 17 N° 3N-102 en el municipio de Ipiales en el departamento de Nariño.

1.2. DESCRIPCIÓN ARQUITECTÓNICA

El proyecto se encuentra ubicado en un lote de **1400 m²** de área aproximadamente, en la cual se contempla la construcción de la Institución educativa Barrio Obrero de dos (2) niveles. El lote será destinado para uso Institucional.

1.3. DESCRIPCIÓN SISTEMA ESTRUCTURAL

Para el análisis se empleó el programa de computador **ETABS v.9.7.4.**, el cual tiene en cuenta los efectos de segundo orden. Las consideraciones sísmicas empleadas en el análisis estructural del proyecto son las siguientes:

- | | |
|---|--------------------------------|
| ✓ Método de análisis: | Análisis Modal |
| ✓ Zona de amenaza sísmica: | Alta |
| ✓ Capacidad de disipación de energía: | Especial |
| ✓ Coeficiente de disipación de energía: | $R_o = 7.00$ |

El coeficiente de disipación de energía se afecta por las irregularidades presentes en la geometría de cada estructura, las cuales se describen a continuación:

- | | | |
|---------------------------------|------------|-----------------|
| ✓ Irregularidad en planta: | 3P | $\phi_p = 0.90$ |
| ✓ Irregularidad en altura: | N.A | $\phi_a = 1.00$ |
| ✓ Redundancia de la estructura: | N.A | $\phi_r = 1.00$ |

El valor final del coeficiente R es igual a **6.30**

Proporción a su rigidez y teniendo en cuenta los efectos de torsión.

El dimensionamiento dado a todos los elementos que intervienen en las estructuras satisfacen los requerimientos de sollicitación ocasionados por las derivas presentes. Las cargas vivas de diseño son: **2.00 kN/m²** para salones de clase, **1.80 kN/m²** para cubierta (Tipo de cubierta F), **5.00 kN/m²** para escaleras, corredores y rampa, de acuerdo a lo establecido en las tablas 4.2.1-1 y 4.2.1-2 de la NSR-10.

Para la cimentación se siguieron las recomendaciones descritas en el respectivo estudio de suelos. Se diseñaron zapatas aisladas para apoyar la estructura a una profundidad de **-1.00m** y conectadas entre sí por vigas de amarre según lo establecido en A.3.6.4.2, de acuerdo a lo indicado en los cortes y detalles que aparecen en los planos estructurales. La capacidad portante de seguridad admisible del suelo utilizada para el dimensionamiento de la cimentación es de **0.151 MPa**. El perfil de suelo es tipo **D**.

El diseño de todas las estructuras se realizó basado en la Norma Colombiana de Diseño y Construcción Sismo Resistente Ley 400 de 1997 (Modificada Ley 1229 de 2008) y Decreto 926 de Marzo de 2010, Decreto 092 del 17 de Enero de 2011, Decreto 0340 del 13 de Febrero de 2012 y en el Reglamento para Concreto Estructural ACI 318S-08.

1.4. MATERIALES

Los materiales utilizados son:

Concreto	21.1 MPa para vigas, placas, zapatas y columnas.
Concreto	14 MPa (para concreto de limpieza).
Acero	para refuerzo $f_y = 420$ MPa para todos los diámetros.

Atentamente:

EDGAR ROLANDO BARRERA
ING. ESTRUCTURAL
T.P. 15202-102710 BYC

JAIR USECHE MACÍAS
ING. ESTRUCTURAL
T.P. 25202-56174 CND

MEMORIAL DE RESPONSABILIDAD

IPIALES, 18 Noviembre de 2016.

Señores
PLANEACION MUNICIPAL
La Ciudad

Yo, **EDGAR ROLANDO BARRERA**, ingeniero civil con Matrícula Profesional N° **15202-102710** de **BOYACÁ**, y Yo, **JAIR USECHE MACÍAS**, ingeniero civil con Matrícula Profesional N° **25202-56174** de **CUNDINAMARCA** debidamente registrados en el consejo profesional de Ingeniería y Arquitectura de Boyacá y Cundinamarca, presentamos los Cálculos y Diseños Estructurales elaborados de acuerdo a los requerimientos de la **NORMA COLOMBIANA DE DISEÑO Y CONSTRUCCIÓN SISMO RESISTENTE LEY 400 DE 1997 (MODIFICADA LEY 1229 DE 2008) Y DECRETO 926 DE MARZO DE 2010**, para el I.E. **BARRIO OBRERO** ubicado en el municipio de **IPIALES (NARIÑO)**, declaramos que asumimos la responsabilidad por los perjuicios que causa de ellos puedan deducirse, exonerando a **PLANEACION MUNICIPAL** de cualquier responsabilidad.

Aceptamos y reconocemos que la revisión efectuada por **PLANEACION MUNICIPAL** no constituye una aprobación al Diseño Estructural, sino una verificación del cumplimiento de la **NORMA COLOMBIANA DE DISEÑO Y CONSTRUCCIÓN SISMO RESISTENTE**.

Atentamente,

EDGAR ROLANDO BARRERA
ING. ESTRUCTURAL
T.P. 15202-102710 BYC

JAIR USECHE MACÍAS
ING. ESTRUCTURAL
T.P. 25202-56174 CND





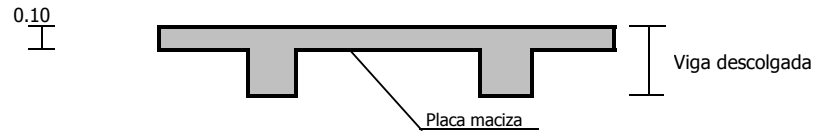
2. AVALÚO DE CARGAS

AVALÚO DE CARGAS

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO,

CLL 17 N°3N-102 IPIALES (NARIÑO)
AVALÚO DE CARGAS

1. PLACA MACIZA - ENTREPISO SALONES



Placa maciza e=0.10m	0.10x24	2.40 kN/m ²
Muros		2.00 kN/m ²
Acabados	20x0.05	1.00 kN/m ²
	CM	5.40 kN/m ²
	CV	2.00 kN/m ²
	CR	7.40 kN/m ²

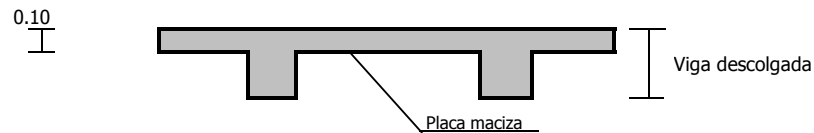
$$CU = 1.2 \times 5.4 + 1.6 \times 2 = 9.7 \text{ kN/m}^2$$

Espesor de placa equivalente:

$$e = CM/24 = 0.225 \text{ m}$$

Muros perimetrales	2.75x0.15x13	5.36 kN/m
--------------------	--------------	-----------

2. PLACA MACIZA - ENTREPISO CORREDORES - ESCALERAS



Placa maciza e=0.10m	0.10x24	2.40 kN/m ²
Muros		0.00 kN/m ²
Acabados	20x0.05	1.00 kN/m ²
	CM	3.40 kN/m ²
	CV	5.00 kN/m ²
	CR	8.40 kN/m ²

$$CU = 1.2 \times 3.4 + 1.6 \times 5 = 12.1 \text{ kN/m}^2$$

Espesor de placa equivalente:

$$e = CM/24 = 0.142 \text{ m}$$

4. CUBIERTA LIVIANA

Teja termo-acústica		0.10 kN/m ²
Estructura metálica de soporte		0.20 kN/m ²
Acabados e iluminacion		0.10 kN/m ²
	CM	0.40 kN/m ²
	CV	0.50 kN/m ²
	CR	0.90 kN/m ²

Tabla 4.2.1-2 de NSR-10 (Tipo de cubierta F)

Muros culata 0.48x0.15x13 0.94 kN/m

$$CU = 1.2 \times 0.4 + 1.6 \times 0.5 = 1.28 \text{ kN/m}^2$$

Espesor de placa equivalente:

$$e = CM/24 = 0.017 \text{ m}$$

Pendiente de Cubierta α (°) = 8.60 → Equivale a 15.1%

B.4.8.3 de NSR-10 (Carga de granizo) CG 0.50 kN/m²

Según la tabla B.4.2.1-2 - En cubiertas inclinadas con más de 15° de pendiente en estructura metálica o de madera la carga viva asumida puede ser 0.35 kN/m².

Según B.4.8.3.1 - Las cargas de granizo deben tenerse en cuenta en las regiones del país con más de 2.000 metros de altura sobre el nivel del mar o en lugares de menor altura donde la autoridad municipal o distrital así lo exija.

Según B.4.8.3.2 - Para cubiertas con inclinación mayor a 15% el valor de la carga viva para granizo puede reducirse a 0.50 kN/m².

PROYECTO: I.E. BARRIO OBRERO AVALÚO DE CARGAS DE VIENTO ANÁLISIS SIMPLIFICADO (sprfv)

Para que le análisis se pueda realizar mediante el método de diseño simplificado se requiere que se cumpla con lo establecido por la NSR-1 título B.6.4.1.1. y B.6.4.1.2.

- a - El edificio sea de diafragma simple como se define en la sección B.6.2.
- b - El edificio sea bajo de acuerdo con lo establecido con la sección B.6.2.
- c - El edificio sea cerrado como se define en la sección B.6.2. y cumpla las provisiones de zonas propensas a huracanes de acuerdo con la sección B.6.5.9.3.
- d - El edificio sea de forma regular como se define en la sección B.6.2.
- e - El edificio no sea clasificado como flexible como se define en la sección B.6.2.
- f - Las características de respuesta del edificio sean tales que el mismo no esté sujeto a las cargas por viento a través de él, a generación de vórtices, a inestabilidad por golpeteo o aleteo, y no esté ubicado en un sitio en el que se puedan presentar efectos de canalización o sacudimiento por la estela de obstrucciones en barlovento, que obliguen a consideraciones especiales.
- g - El edificio tenga una sección transversal aproximadamente simétrica en cada dirección y tenga una cubierta plana o cubierta a dos o cuatro aguas con ángulo de inclinación $\phi \leq 45^\circ$
- h - El edificio esta eximido de los casos de carga torsional indicados en la nota 5 de la figura B.6.5.7. o estos casos no controlan el diseño de ninguno de los elementos del SPRFV del edificio.

De los anteriores parametros se observa que la edificación cumple con lo estipulado, por lo tanto:

Tipo de análisis permitido: ANÁLISIS SIMPLIFICADO

Entonces: $P_s = \lambda K_{zt} I P_{s10}$

Donde:

- λ = Factor de ajuste por altura y exposición, figura B.6.4.2.
- K_{zt} = Factor topográfico comose define en la sección B.6.5.7. evaluado a la altura promedio de la cubierta, **h**, B.6.5.1.
- I = Factor de importancia como se define en la sección B.6.5.5.
- P_{s10} = Presión de viento de diseño simplificado para la categoria de exposición **B**, con **h=10** m de la figura B.6.4.2.

	CIUDAD	ZONA	VELOCIDAD DEL VIENTO
Zona de amenaza eólica=	IPIALES	3	100

Luego:

- λ = 1.0
- K_{zt} = 1.0
- I = 1.3
- P_{s10} = **0.23**

Según B.6.4.2.1.1. Presiones mínimas: Los efectos de carga de las presiones de viento de diseño de la sección B.6.4.2.1. no serán menores que el caso de carga mínima de la sección B.6.1.3.1. suponiendo presiones P_s , de +0.40 kN/m² para las zonas de A, B, C y D y d 0.00 kN/m² para las zonas E, F, G y H.

Por lo tanto la carga de viento a emplear es: **0.40** kN/m²

3. ANÁLISIS SÍSMICO

*ANÁLISIS MODAL
CÁLCULO DE DERIVAS MÁXIMAS
ESPECTRO DE UMBRAL DE DAÑO*

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO
CLL 17 N° 3N-102 IPIALES (NARIÑO)
ANÁLISIS SÍSMICO (ESPECTRO DE DISEÑO NSR-10)

ZONA DE AMENAZA SÍSMICA
ALTA

EFFECTOS LOCALES

Perfil de Suelo	D
Coefficiente Aa	0.30
Coefficiente Av	0.25

COEFICIENTE DE IMPORTANCIA

Grupo de Uso	III
Coefficiente de importancia I	1.25

PERIODO FUNDAMENTAL DE LA EDIFICACIÓN

$T_a = C_t h^\alpha$		
$C_t =$	0.047	
$h =$	6.65	m
$\alpha =$	0.90	
$T_a =$	0.26	Seg

VARIACIÓN COEFICIENTE DE CAPACIDAD DE DISIPACIÓN DE ENERGÍA

R_o : Coeficiente de capacidad de disipación de energía básico

R : Coeficiente de capacidad de disipación de energía, para ser empleado en el diseño.

ϕ_a : Coeficiente de reducción de R causado por irregularidades en altura de la edificación

ϕ_p : Coeficiente de reducción de R causado por irregularidades en planta de la edificación

ϕ_r : Coeficiente de reducción de R causado por ausencia de redundancia en el sistema estructural de resistencia sísmica

R_o	7.00
ϕ_a	0.90
ϕ_p	1.00
ϕ_r	1.00
ϕ	1.00
R	6.30

TIPO	DESCRIPCIÓN	VALOR
	3P	ϕ_p : 0.90
		ϕ_a : 1.00
	REDUNDANCIA	ϕ_r : 1.00
	UNIONES SOLDADAS	ϕ : 1.00

ESPECTRO DE DISEÑO (AMORTIGUAMIENTO $\xi=5\%$ DEL CRÍTICO)

Fa: Factor de ampliación de la aceleración.

Fv: Factor de ampliación de la aceleración en el rango de velocidades constantes.

Sa: Valor del espectro de aceleraciones de diseño para un periodo de vibración dado.

Aa: Coeficiente que representa la aceleración horizontal pico efectiva para diseño.

Av: Coeficiente que representa la velocidad horizontal pico efectiva para diseño.

T: Periodo de vibración del sistema elástico, en segundos.

T_C : Periodo de vibración, en segundos, correspondiente a la transición entre la zona de aceleración constante del espectro de diseño, para periodos cortos, y la parte descendiente del mismo.

T_L : Periodo de vibración, en segundos, correspondiente al inicio de la zona de desplazamiento aproximadamente constante del espectro de diseño para periodos largos.

ZONA DE AMENAZA ALTA

T_0:	0.13	Seg
T_C:	0.63	Seg
T_L:	4.56	Seg
Aa:	0.30	
Av:	0.25	
Fa:	1.20	
Fv:	1.90	

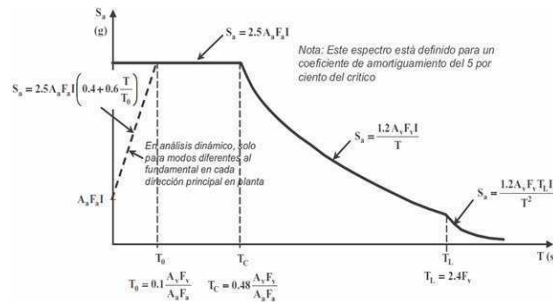
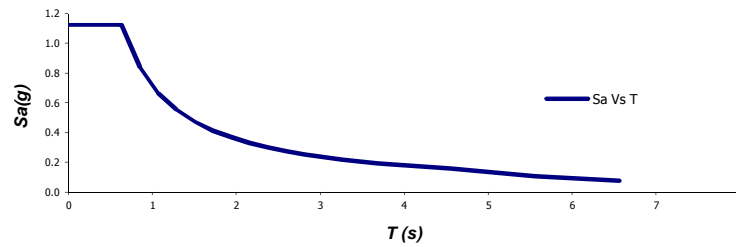


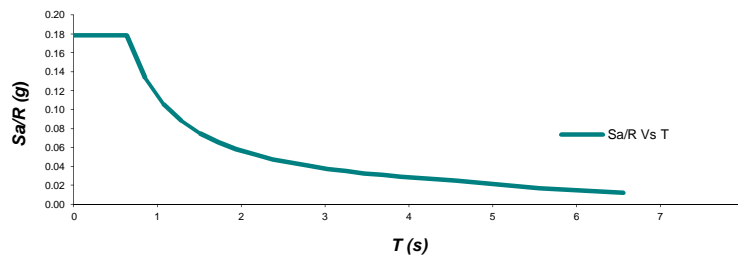
Figura A.2.6-1 — Espectro Elástico de Aceleraciones de Diseño como fracción de g

T	Sa	Sa/R _{adoptado}
(Seg)	(%g)	(%g)
0.00	1.125	0.179
0.03	1.125	0.179
0.07	1.125	0.179
0.10	1.125	0.179
0.13	1.125	0.179
0.26	1.125	0.179
0.38	1.125	0.179
0.51	1.125	0.179
0.63	1.125	0.179
0.85	0.837	0.133
1.07	0.666	0.106
1.29	0.553	0.088
1.51	0.473	0.075
1.72	0.413	0.066
1.94	0.367	0.058
2.16	0.330	0.052
2.38	0.300	0.048
2.60	0.274	0.044
2.81	0.253	0.040
3.03	0.235	0.037
3.25	0.219	0.035
3.47	0.205	0.033
3.69	0.193	0.031
3.91	0.182	0.029
4.12	0.173	0.027
4.34	0.164	0.026
4.56	0.156	0.025
5.56	0.105	0.017
6.56	0.075	0.012

Espectro Elástico de Diseño



Espectro Elástico de Diseño/ R_{adop}



Sistema de resistencia Sísmica: Pórticos resistentes a momentos con Capacidad Especial de Disipación de Energía (DES).

Nota: El sistema de pórtico es un sistema estructural compuesto por un pórtico espacial, resistente a momentos, esencialmente completo, sin diagonales, que resiste todas las cargas verticales y las fuerzas horizontales.

MODELO MATEMÁTICO

Modelo Tridimensional con Diafragma Rígido: En este modelo los entrepisos se consideran diafragmas infinitamente rígidos en su propio plano. La masa de cada diafragma se considera concentrada en su centro de masa. Los efectos torsionales accidentales son incluidos haciendo ajustes en la localización de los centros de masa de los diafragmas. Los efectos direccionales son tomados en cuenta a través de las componentes de los desplazamientos de los grados de libertad horizontales ortogonales del diafragma.

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO
CLL 17 N° 3N-102 IPIALES (NARIÑO)
ANÁLISIS SÍSMICO (ESPECTRO DE UMBRAL DE DAÑO NSR-10)

ZONA DE AMENAZA SÍSMICA
ALTA

EFFECTOS LOCALES

Perfil de Suelo	D
Coefficiente Ad	0.08
Coefficiente Fv	2.40

COEFICIENTE DE IMPORTANCIA

Grupo de Uso	III
Coefficiente de importancia I	1.25
Coefficiente de Sitio S:	3.00

ESPECTRO DE UMBRAL DE DAÑO (AMORTIGUAMIENTO $\xi=2\%$ DEL CRÍTICO)

Sad: Valor del espectro de aceleraciones del umbral de daño para un periodo de vibración dado.

Ad: Máxima aceleración pico efectiva para el umbral de daño.

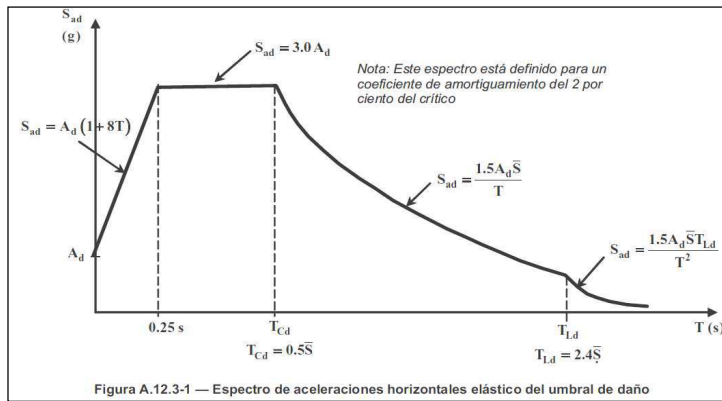
T: Periodo de vibración del sistema elástico, en segundos.

T_{cd}: Periodo de vibración, en segundos, correspondiente a la transición entre la zona de aceleración constante del espectro sísmico del umbral de daño, para periodos cortos, y la parte descendiente del mismo.

T_{ld}: Periodo de vibración, en segundos, correspondiente a la transición entre la zona de desplazamiento constante del espectro sísmico del umbral de daño, para periodos largos.

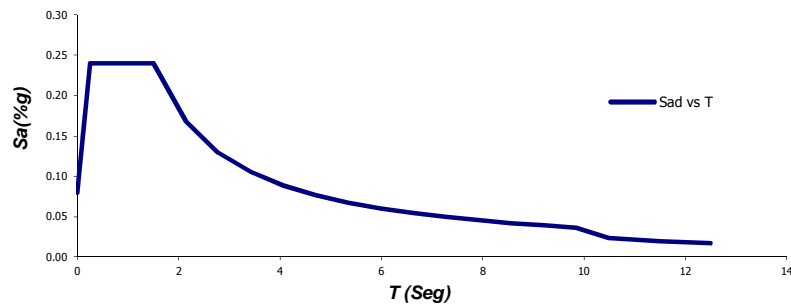
Ad: 0.08
T_{cd}: 1.50 Seg
T_{ld}: 7.2 Seg

T (Seg)	Sad (%g)
0.00	0.080
0.05	0.112
0.10	0.144
0.15	0.176
0.20	0.208
0.25	0.240
0.41	0.240
0.56	0.240
0.72	0.240
0.88	0.240
1.03	0.240
1.19	0.240
1.34	0.240



1.50	0.240
2.14	0.168
2.79	0.129
3.43	0.105
4.07	0.088
4.71	0.076
5.36	0.067
6.00	0.060
6.64	0.054
7.29	0.049
7.93	0.045
8.57	0.042
9.21	0.039
9.86	0.037
10.50	0.024
11.50	0.020
12.50	0.017

Espectro Del Umbral de Daño



Sistema de resistencia Sísmica: Pórticos resistentes a momentos con Capacidad Especial de Disipación de Energía (DES).

Nota: El sistema de pórtico es un sistema estructural compuesto por un pórtico espacial, resistente a momentos, esencialmente completo, sin diagonales, que resiste todas las cargas verticales y las fuerzas horizontales.

MODELO MATEMÁTICO

Modelo Tridimensional con Diafragma Rígido: En este modelo los entrepisos se consideran diafragmas infinitamente rígidos en su propio plano. La masa de cada diafragma se considera concentrada en su centro de masa. Los efectos torsionales accidentales son incluidos haciendo ajustes en la localización de los centros de masa de los diafragmas. Los efectos direccionales son tomados en cuenta a través de las componentes de los desplazamientos de los grados de libertad horizontales ortogonales del diafragma.



PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, CLL 17 N° 3N-102 IPIALES (NARIÑO)
CALCULO DEL CORTANTE BASAL DE LA ESTRUCTURA (ESPECTRO DE DISEÑO NSR-10)

CALCULO DEL CORTANTE BASAL DE LA ESTRUCTURA

H _{edificio} =	6.65	m	
Tipo de Perfil:	D		
A _a =	0.30		
A _v =	0.25		
F _a =	1.20		
F _v =	1.90		
T _c =	0.63	Seg	
C _t =	0.047		
α =	0.90		
T _a =	0.26	Seg	
C _u =	1.20		
C _u T _a =	0.31	Seg	
T _{modelación estructural} =	0.26	Seg	
ΔT =	0.54	%	Ok!
T _{adoptado} =	0.26	Seg	
S _a =	1.125		S _a obtenido del espectro de diseño
g =	9.81	m/s ²	
M =	400.81	Ton	Masa obtenida del modelo
V _s =	4423.44	kN	
90% V _s =	3981.10	kN	Cortante basal para comparación de acuerdo a A.5.4.5 NSR-10

MODELO INICIAL

Response Spectrum Base Reactions

PORCENTAJE PARA REVISIÓN DE CORTANTE BASAL DE ACUERDO A A.5.4.5 NSR-10: 90.0 %

	F1	F2	Factor	g corregido
V _{s(x)} =	3859.39	-	1.032	10.119
V _{s(y)} =	-	4095.68	0.972	9.536

MODELO CORREGIDO

Response Spectrum Base Reactions

	F1	F2	90% V _s
V _{s(x)} =	3980.95	-	3981.1
V _{s(y)} =	-	4095.68	3981.1



PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, CLL 17 N° 3N-102 IPIALES (NARIÑO)
CALCULO DEL CORTANTE BASAL DE LA ESTRUCTURA (ESPECTRO DE UMBRAL DE DAÑO NSR-10)

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, CLL 17 N° 3N-102 IPIALES (NARIÑO)
CALCULO DEL CORTANTE BASAL DE LA ESTRUCTURA (ESPECTRO DE UMBRAL DE DAÑO NSR-10)

CALCULO DEL CORTANTE BASAL DE LA ESTRUCTURA

$H_{edificio} = 6.65$ m
 Tipo de Perfil: D
 $A_d = 0.08$
 $F_v = 2.40$
 $C_t = 0.047$
 $\alpha = 0.90$
 $T_a = 0.26$ Seg
 $C_u = 1.20$
 $C_u T_a = 0.31$ Seg
 $T_{modelación\ estructural} = 0.26$ Seg
 $\Delta T = 0.54$ % Ok!
 $T_{adoptado} = 0.26$ Seg
 $S_a = 0.240$ S_a obtenido del espectro de diseño
 $g = 9.81$ m/s²
 $M = 400.81$ Ton Masa obtenida del modelo
 $V_s = 943.67$ kN

MODELO INICIAL

Response Spectrum Base Reactions

PORCENTAJE PARA REVISIÓN DE CORTANTE BASAL DE ACUERDO A A.5.4.5 NSR-10: 100.0 %

	F1	F2	Factor	g corregido
$V_{s(x)} =$	822.82	-	1.147	11.251 Se aplica en SISMO X
$V_{s(y)} =$	-	873.51	1.080	10.598 Se aplica en SISMO Y

MODELO CORREGIDO

Response Spectrum Base Reactions

	F1	F2	100% Vs
$V_{s(x)} =$	943.68	-	943.7
$V_{s(y)} =$	-	979.87	943.7

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, CLL 17 N°3N-102

CÁLCULO DE DERIVAS MÁXIMAS

ALTURA DE N+6.65 **3.20** m
ALTURA DE N+3.45 **3.50** m
ALTURA DE BASE **0.00** m

Deriva Máxima
Permitida **1.00** %

Nivel	Punto	COMBINACIÓN DE CARGA	DESPLAZAMIENTOS FUERZA SÍSMICA Desplazamiento X	Desplazamiento Y	Deriva Δ m	Deriva Δ %	Observación
N+6.65	1	COMDER1 MAX	0.03264	0.0196	0.01531	0.48	OK
N+6.65	1	COMDER1 MIN	-0.03264	-0.0196	0.01531	0.48	OK
N+6.65	1	COMDER2 MAX	0.02088	0.0348	0.01536	0.48	OK
N+6.65	1	COMDER2 MIN	-0.02088	-0.0348	0.01536	0.48	OK
N+3.45	1	COMDER1 MAX	0.01904	0.01256	0.02281	0.65	OK
N+3.45	1	COMDER1 MIN	-0.01904	-0.01256	0.02281	0.65	OK
N+3.45	1	COMDER2 MAX	0.01216	0.02216	0.02528	0.72	OK
N+3.45	1	COMDER2 MIN	-0.01216	-0.02216	0.02528	0.72	OK
BASE	1	COMDER1 MAX	0	0	--	--	--
BASE	1	COMDER1 MIN	0	0	--	--	--
BASE	1	COMDER2 MAX	0	0	--	--	--
BASE	1	COMDER2 MIN	0	0	--	--	--
N+6.65	2	COMDER1 MAX	0.03264	0.02944	0.01712	0.54	OK
N+6.65	2	COMDER1 MIN	-0.03264	-0.02944	0.01712	0.54	OK
N+6.65	2	COMDER2 MAX	0.02088	0.04248	0.01787	0.56	OK
N+6.65	2	COMDER2 MIN	-0.02088	-0.04248	0.01787	0.56	OK
N+3.45	2	COMDER1 MAX	0.01904	0.01904	0.02693	0.77	OK
N+3.45	2	COMDER1 MIN	-0.01904	-0.01904	0.02693	0.77	OK
N+3.45	2	COMDER2 MAX	0.01216	0.02688	0.02950	0.84	OK
N+3.45	2	COMDER2 MIN	-0.01216	-0.02688	0.02950	0.84	OK
BASE	2	COMDER1 MAX	0	0	--	--	--
BASE	2	COMDER1 MIN	0	0	--	--	--
BASE	2	COMDER2 MAX	0	0	--	--	--
BASE	2	COMDER2 MIN	0	0	--	--	--
N+3.45	3	COMDER1 MAX	0.01784	0.01256	0.02182	0.62	OK
N+3.45	3	COMDER1 MIN	-0.01784	-0.01256	0.02182	0.62	OK
N+3.45	3	COMDER2 MAX	0.01456	0.02216	0.02652	0.76	OK
N+3.45	3	COMDER2 MIN	-0.01456	-0.02216	0.02652	0.76	OK
BASE	3	COMDER1 MAX	0	0	--	--	--
BASE	3	COMDER1 MIN	0	0	--	--	--
BASE	3	COMDER2 MAX	0	0	--	--	--
BASE	3	COMDER2 MIN	0	0	--	--	--
N+3.45	4	COMDER1 MAX	0.01784	0.01904	0.02609	0.75	OK
N+3.45	4	COMDER1 MIN	-0.01784	-0.01904	0.02609	0.75	OK
N+3.45	4	COMDER2 MAX	0.01456	0.02688	0.03057	0.87	OK
N+3.45	4	COMDER2 MIN	-0.01456	-0.02688	0.03057	0.87	OK
BASE	4	COMDER1 MAX	0	0	--	--	--
BASE	4	COMDER1 MIN	0	0	--	--	--
BASE	4	COMDER2 MAX	0	0	--	--	--
BASE	4	COMDER2 MIN	0	0	--	--	--
N+6.65	5	COMDER1 MAX	0.03376	0.01616	0.01495	0.47	OK
N+6.65	5	COMDER1 MIN	-0.03376	-0.01616	0.01495	0.47	OK
N+6.65	5	COMDER2 MAX	0.01896	0.032	0.01405	0.44	OK
N+6.65	5	COMDER2 MIN	-0.01896	-0.032	0.01405	0.44	OK
N+3.45	5	COMDER1 MAX	0.02	0.01032	0.02251	0.64	OK
N+3.45	5	COMDER1 MIN	-0.02	-0.01032	0.02251	0.64	OK
N+3.45	5	COMDER2 MAX	0.01104	0.0204	0.02320	0.66	OK
N+3.45	5	COMDER2 MIN	-0.01104	-0.0204	0.02320	0.66	OK
BASE	5	COMDER1 MAX	0	0	--	--	--
BASE	5	COMDER1 MIN	0	0	--	--	--
BASE	5	COMDER2 MAX	0	0	--	--	--
BASE	5	COMDER2 MIN	0	0	--	--	--
N+6.65	6	COMDER1 MAX	0.03528	0.02944	0.01757	0.55	OK
N+6.65	6	COMDER1 MIN	-0.03528	-0.02944	0.01757	0.55	OK
N+6.65	6	COMDER2 MAX	0.01696	0.04248	0.01708	0.53	OK
N+6.65	6	COMDER2 MIN	-0.01696	-0.04248	0.01708	0.53	OK
N+3.45	6	COMDER1 MAX	0.02112	0.01904	0.02844	0.81	OK
N+3.45	6	COMDER1 MIN	-0.02112	-0.01904	0.02844	0.81	OK
N+3.45	6	COMDER2 MAX	0.01	0.02688	0.02868	0.82	OK
N+3.45	6	COMDER2 MIN	-0.01	-0.02688	0.02868	0.82	OK
BASE	6	COMDER1 MAX	0	0	--	--	--
BASE	6	COMDER1 MIN	0	0	--	--	--
BASE	6	COMDER2 MAX	0	0	--	--	--
BASE	6	COMDER2 MIN	0	0	--	--	--

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, CLL 17 N°3N-102

CÁLCULO DE DERIVAS MÁXIMAS

ALTURA DE N+6.65 **3.20** m
ALTURA DE N+3.45 **3.50** m
ALTURA DE BASE **0.00** m

Deriva Máxima Permitida **1.00** %

Nivel	Punto	COMBINACIÓN DE CARGA	DESPLAZAMIENTOS FUERZA SÍSMICA Desplazamiento X	Desplazamiento Y	Deriva Δ m	Deriva Δ %	Observación
N+6.65	7	COMDER1 MAX	0.03528	0.0196	0.01581	0.49	OK
N+6.65	7	COMDER1 MIN	-0.03528	-0.0196	0.01581	0.49	OK
N+6.65	7	COMDER2 MAX	0.01696	0.0348	0.01443	0.45	OK
N+6.65	7	COMDER2 MIN	-0.01696	-0.0348	0.01443	0.45	OK
N+3.45	7	COMDER1 MAX	0.02112	0.01256	0.02457	0.70	OK
N+3.45	7	COMDER1 MIN	-0.02112	-0.01256	0.02457	0.70	OK
N+3.45	7	COMDER2 MAX	0.01	0.02216	0.02431	0.69	OK
N+3.45	7	COMDER2 MIN	-0.01	-0.02216	0.02431	0.69	OK
BASE	7	COMDER1 MAX	0	0	--	--	--
BASE	7	COMDER1 MIN	0	0	--	--	--
BASE	7	COMDER2 MAX	0	0	--	--	--
BASE	7	COMDER2 MIN	0	0	--	--	--
N+6.65	8	COMDER1 MAX	0.03528	0.01336	0.01493	0.47	OK
N+6.65	8	COMDER1 MIN	-0.03528	-0.01336	0.01493	0.47	OK
N+6.65	8	COMDER2 MAX	0.01696	0.0292	0.01245	0.39	OK
N+6.65	8	COMDER2 MIN	-0.01696	-0.0292	0.01245	0.39	OK
N+3.45	8	COMDER1 MAX	0.02112	0.00864	0.02282	0.65	OK
N+3.45	8	COMDER1 MIN	-0.02112	-0.00864	0.02282	0.65	OK
N+3.45	8	COMDER2 MAX	0.01	0.01888	0.02136	0.61	OK
N+3.45	8	COMDER2 MIN	-0.01	-0.01888	0.02136	0.61	OK
BASE	8	COMDER1 MAX	0	0	--	--	--
BASE	8	COMDER1 MIN	0	0	--	--	--
BASE	8	COMDER2 MAX	0	0	--	--	--
BASE	8	COMDER2 MIN	0	0	--	--	--
N+6.65	9	COMDER1 MAX	0.03528	0.01904	0.01557	0.49	OK
N+6.65	9	COMDER1 MIN	-0.03528	-0.01904	0.01557	0.49	OK
N+6.65	9	COMDER2 MAX	0.01696	0.03032	0.01258	0.39	OK
N+6.65	9	COMDER2 MIN	-0.01696	-0.03032	0.01258	0.39	OK
N+3.45	9	COMDER1 MAX	0.02112	0.01256	0.02457	0.70	OK
N+3.45	9	COMDER1 MIN	-0.02112	-0.01256	0.02457	0.70	OK
N+3.45	9	COMDER2 MAX	0.01	0.01984	0.02222	0.63	OK
N+3.45	9	COMDER2 MIN	-0.01	-0.01984	0.02222	0.63	OK
BASE	9	COMDER1 MAX	0	0	--	--	--
BASE	9	COMDER1 MIN	0	0	--	--	--
BASE	9	COMDER2 MAX	0	0	--	--	--
BASE	9	COMDER2 MIN	0	0	--	--	--
N+6.65	10	COMDER1 MAX	0.03528	0.02752	0.01689	0.53	OK
N+6.65	10	COMDER1 MIN	-0.03528	-0.02752	0.01689	0.53	OK
N+6.65	10	COMDER2 MAX	0.01696	0.03256	0.01298	0.41	OK
N+6.65	10	COMDER2 MIN	-0.01696	-0.03256	0.01298	0.41	OK
N+3.45	10	COMDER1 MAX	0.02112	0.01832	0.02796	0.80	OK
N+3.45	10	COMDER1 MIN	-0.02112	-0.01832	0.02796	0.80	OK
N+3.45	10	COMDER2 MAX	0.01	0.0216	0.02380	0.68	OK
N+3.45	10	COMDER2 MIN	-0.01	-0.0216	0.02380	0.68	OK
BASE	10	COMDER1 MAX	0	0	--	--	--
BASE	10	COMDER1 MIN	0	0	--	--	--
BASE	10	COMDER2 MAX	0	0	--	--	--
BASE	10	COMDER2 MIN	0	0	--	--	--
N+6.65	11	COMDER1 MAX	0.03728	0.02752	0.01729	0.54	OK
N+6.65	11	COMDER1 MIN	-0.03728	-0.02752	0.01729	0.54	OK
N+6.65	11	COMDER2 MAX	0.0168	0.03256	0.01281	0.40	OK
N+6.65	11	COMDER2 MIN	-0.0168	-0.03256	0.01281	0.40	OK
N+3.45	11	COMDER1 MAX	0.02264	0.01832	0.02912	0.83	OK
N+3.45	11	COMDER1 MIN	-0.02264	-0.01832	0.02912	0.83	OK
N+3.45	11	COMDER2 MAX	0.01016	0.0216	0.02387	0.68	OK
N+3.45	11	COMDER2 MIN	-0.01016	-0.0216	0.02387	0.68	OK
BASE	11	COMDER1 MAX	0	0	--	--	--
BASE	11	COMDER1 MIN	0	0	--	--	--
BASE	11	COMDER2 MAX	0	0	--	--	--
BASE	11	COMDER2 MIN	0	0	--	--	--
N+6.65	12	COMDER1 MAX	0.03728	0.01904	0.01601	0.50	OK
N+6.65	12	COMDER1 MIN	-0.03728	-0.01904	0.01601	0.50	OK
N+6.65	12	COMDER2 MAX	0.0168	0.03032	0.01241	0.39	OK
N+6.65	12	COMDER2 MIN	-0.0168	-0.03032	0.01241	0.39	OK

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, CLL 17 N°3N-102

CÁLCULO DE DERIVAS MÁXIMAS

ALTURA DE N+6.65 **3.20** m
ALTURA DE N+3.45 **3.50** m
ALTURA DE BASE **0.00** m

Deriva Máxima
Permitida **1.00** %

Nivel	Punto	COMBINACIÓN DE CARGA	DESPLAZAMIENTOS FUERZA SÍSMICA Desplazamiento X	Desplazamiento Y	Deriva Δ m	Deriva Δ %	Observación
N+3.45	12	COMDER1 MAX	0.02264	0.01256	0.02589	0.74	OK
N+3.45	12	COMDER1 MIN	-0.02264	-0.01256	0.02589	0.74	OK
N+3.45	12	COMDER2 MAX	0.01016	0.01984	0.02229	0.64	OK
N+3.45	12	COMDER2 MIN	-0.01016	-0.01984	0.02229	0.64	OK
BASE	12	COMDER1 MAX	0	0	--	--	--
BASE	12	COMDER1 MIN	0	0	--	--	--
BASE	12	COMDER2 MAX	0	0	--	--	--
BASE	12	COMDER2 MIN	0	0	--	--	--
N+6.65	13	COMDER1 MAX	0.03728	0.01336	0.01538	0.48	OK
N+6.65	13	COMDER1 MIN	-0.03728	-0.01336	0.01538	0.48	OK
N+6.65	13	COMDER2 MAX	0.0168	0.0292	0.01227	0.38	OK
N+6.65	13	COMDER2 MIN	-0.0168	-0.0292	0.01227	0.38	OK
N+3.45	13	COMDER1 MAX	0.02264	0.00864	0.02423	0.69	OK
N+3.45	13	COMDER1 MIN	-0.02264	-0.00864	0.02423	0.69	OK
N+3.45	13	COMDER2 MAX	0.01016	0.01888	0.02144	0.61	OK
N+3.45	13	COMDER2 MIN	-0.01016	-0.01888	0.02144	0.61	OK
BASE	13	COMDER1 MAX	0	0	--	--	--
BASE	13	COMDER1 MIN	0	0	--	--	--
BASE	13	COMDER2 MAX	0	0	--	--	--
BASE	13	COMDER2 MIN	0	0	--	--	--
N+6.65	14	COMDER1 MAX	0.03728	0.0196	0.01624	0.51	OK
N+6.65	14	COMDER1 MIN	-0.03728	-0.0196	0.01624	0.51	OK
N+6.65	14	COMDER2 MAX	0.0168	0.0348	0.01428	0.45	OK
N+6.65	14	COMDER2 MIN	-0.0168	-0.0348	0.01428	0.45	OK
N+3.45	14	COMDER1 MAX	0.02264	0.01256	0.02589	0.74	OK
N+3.45	14	COMDER1 MIN	-0.02264	-0.01256	0.02589	0.74	OK
N+3.45	14	COMDER2 MAX	0.01016	0.02216	0.02438	0.70	OK
N+3.45	14	COMDER2 MIN	-0.01016	-0.02216	0.02438	0.70	OK
BASE	14	COMDER1 MAX	0	0	--	--	--
BASE	14	COMDER1 MIN	0	0	--	--	--
BASE	14	COMDER2 MAX	0	0	--	--	--
BASE	14	COMDER2 MIN	0	0	--	--	--
N+6.65	15	COMDER1 MAX	0.03728	0.02944	0.01796	0.56	OK
N+6.65	15	COMDER1 MIN	-0.03728	-0.02944	0.01796	0.56	OK
N+6.65	15	COMDER2 MAX	0.0168	0.04248	0.01695	0.53	OK
N+6.65	15	COMDER2 MIN	-0.0168	-0.04248	0.01695	0.53	OK
N+3.45	15	COMDER1 MAX	0.02264	0.01904	0.02958	0.85	OK
N+3.45	15	COMDER1 MIN	-0.02264	-0.01904	0.02958	0.85	OK
N+3.45	15	COMDER2 MAX	0.01016	0.02688	0.02874	0.82	OK
N+3.45	15	COMDER2 MIN	-0.01016	-0.02688	0.02874	0.82	OK
BASE	15	COMDER1 MAX	0	0	--	--	--
BASE	15	COMDER1 MIN	0	0	--	--	--
BASE	15	COMDER2 MAX	0	0	--	--	--
BASE	15	COMDER2 MIN	0	0	--	--	--
N+6.65	16	COMDER1 MAX	0.04176	0.02752	0.01853	0.58	OK
N+6.65	16	COMDER1 MIN	-0.04176	-0.02752	0.01853	0.58	OK
N+6.65	16	COMDER2 MAX	0.01832	0.03256	0.01303	0.41	OK
N+6.65	16	COMDER2 MIN	-0.01832	-0.03256	0.01303	0.41	OK
N+3.45	16	COMDER1 MAX	0.02568	0.01832	0.03154	0.90	OK
N+3.45	16	COMDER1 MIN	-0.02568	-0.01832	0.03154	0.90	OK
N+3.45	16	COMDER2 MAX	0.01128	0.0216	0.02437	0.70	OK
N+3.45	16	COMDER2 MIN	-0.01128	-0.0216	0.02437	0.70	OK
BASE	16	COMDER1 MAX	0	0	--	--	--
BASE	16	COMDER1 MIN	0	0	--	--	--
BASE	16	COMDER2 MAX	0	0	--	--	--
BASE	16	COMDER2 MIN	0	0	--	--	--
N+6.65	17	COMDER1 MAX	0.04552	0.01904	0.01838	0.57	OK
N+6.65	17	COMDER1 MIN	-0.04552	-0.01904	0.01838	0.57	OK
N+6.65	17	COMDER2 MAX	0.02008	0.03032	0.01290	0.40	OK
N+6.65	17	COMDER2 MIN	-0.02008	-0.03032	0.01290	0.40	OK
N+3.45	17	COMDER1 MAX	0.02832	0.01256	0.03098	0.89	OK
N+3.45	17	COMDER1 MIN	-0.02832	-0.01256	0.03098	0.89	OK
N+3.45	17	COMDER2 MAX	0.01256	0.01984	0.02348	0.67	OK
N+3.45	17	COMDER2 MIN	-0.01256	-0.01984	0.02348	0.67	OK

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, CLL 17 N°3N-102

CÁLCULO DE DERIVAS MÁXIMAS

ALTURA DE N+6.65 **3.20** m
ALTURA DE N+3.45 **3.50** m
ALTURA DE BASE **0.00** m

Deriva Máxima Permitida **1.00** %

Nivel	Punto	COMBINACIÓN DE CARGA	DESPLAZAMIENTOS FUERZA SÍSMICA		Deriva Δ m	Deriva Δ %	Observación
			Desplazamiento X	Desplazamiento Y			
BASE	17	COMDER1 MAX	0	0	--	--	--
BASE	17	COMDER1 MIN	0	0	--	--	--
BASE	17	COMDER2 MAX	0	0	--	--	--
BASE	17	COMDER2 MIN	0	0	--	--	--
N+6.65	18	COMDER1 MAX	0.04552	0.01336	0.01784	0.56	OK
N+6.65	18	COMDER1 MIN	-0.04552	-0.01336	0.01784	0.56	OK
N+6.65	18	COMDER2 MAX	0.02008	0.0292	0.01277	0.40	OK
N+6.65	18	COMDER2 MIN	-0.02008	-0.0292	0.01277	0.40	OK
N+3.45	18	COMDER1 MAX	0.02832	0.00864	0.02961	0.85	OK
N+3.45	18	COMDER1 MIN	-0.02832	-0.00864	0.02961	0.85	OK
N+3.45	18	COMDER2 MAX	0.01256	0.01888	0.02268	0.65	OK
N+3.45	18	COMDER2 MIN	-0.01256	-0.01888	0.02268	0.65	OK
BASE	18	COMDER1 MAX	0	0	--	--	--
BASE	18	COMDER1 MIN	0	0	--	--	--
BASE	18	COMDER2 MAX	0	0	--	--	--
BASE	18	COMDER2 MIN	0	0	--	--	--
N+6.65	19	COMDER1 MAX	0.04552	0.0196	0.01858	0.58	OK
N+6.65	19	COMDER1 MIN	-0.04552	-0.0196	0.01858	0.58	OK
N+6.65	19	COMDER2 MAX	0.02008	0.0348	0.01471	0.46	OK
N+6.65	19	COMDER2 MIN	-0.02008	-0.0348	0.01471	0.46	OK
N+3.45	19	COMDER1 MAX	0.02832	0.01256	0.03098	0.89	OK
N+3.45	19	COMDER1 MIN	-0.02832	-0.01256	0.03098	0.89	OK
N+3.45	19	COMDER2 MAX	0.01256	0.02216	0.02547	0.73	OK
N+3.45	19	COMDER2 MIN	-0.01256	-0.02216	0.02547	0.73	OK
BASE	19	COMDER1 MAX	0	0	--	--	--
BASE	19	COMDER1 MIN	0	0	--	--	--
BASE	19	COMDER2 MAX	0	0	--	--	--
BASE	19	COMDER2 MIN	0	0	--	--	--
N+6.65	20	COMDER1 MAX	0.04552	0.02944	0.02010	0.63	OK
N+6.65	20	COMDER1 MIN	-0.04552	-0.02944	0.02010	0.63	OK
N+6.65	20	COMDER2 MAX	0.02008	0.04248	0.01732	0.54	OK
N+6.65	20	COMDER2 MIN	-0.02008	-0.04248	0.01732	0.54	OK
N+3.45	20	COMDER1 MAX	0.02832	0.01904	0.03413	0.98	OK
N+3.45	20	COMDER1 MIN	-0.02832	-0.01904	0.03413	0.98	OK
N+3.45	20	COMDER2 MAX	0.01256	0.02688	0.02967	0.85	OK
N+3.45	20	COMDER2 MIN	-0.01256	-0.02688	0.02967	0.85	OK
BASE	20	COMDER1 MAX	0	0	--	--	--
BASE	20	COMDER1 MIN	0	0	--	--	--
BASE	20	COMDER2 MAX	0	0	--	--	--
BASE	20	COMDER2 MIN	0	0	--	--	--

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, CLL 17 N°3N-102

CÁLCULO DE DERIVAS MÁXIMAS (ESPECTRO DE UMBRAL DE DAÑO)

ALTURA DE N+6.65 **3.20** m
ALTURA DE N+3.45 **3.50** m
ALTURA DE BASE **0.00** m

Deriva Máxima Permitida **0.40** %

Nivel	Punto	COMBINACIÓN DE CARGA	DESPLAZAMIENTOS FUERZA SÍSMICA		Deriva Δ	Deriva Δ	Observación
			Desplazamiento X	Desplazamiento Y	m	%	
N+6.65	1	COMDERUMB MAX	0.00960	0.00570	0.00447	0.14	OK
N+6.65	1	COMDERUMB MIN	-0.00960	-0.00570	0.00447	0.14	OK
N+6.65	1	COMDERUMB2 MAX	0.00610	0.01000	0.00444	0.14	OK
N+6.65	1	COMDERUMB2 MIN	-0.00610	-0.01000	0.00444	0.14	OK
N+3.45	1	COMDERUMB MAX	0.00560	0.00370	0.00671	0.19	OK
N+3.45	1	COMDERUMB MIN	-0.00560	-0.00370	0.00671	0.19	OK
N+3.45	1	COMDERUMB2 MAX	0.00350	0.00640	0.00729	0.21	OK
N+3.45	1	COMDERUMB2 MIN	-0.00350	-0.00640	0.00729	0.21	OK
BASE	1	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	1	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	1	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	1	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+6.65	2	COMDERUMB MAX	0.00960	0.00860	0.00500	0.16	OK
N+6.65	2	COMDERUMB MIN	-0.00960	-0.00860	0.00500	0.16	OK
N+6.65	2	COMDERUMB2 MAX	0.00610	0.01230	0.00520	0.16	OK
N+6.65	2	COMDERUMB2 MIN	-0.00610	-0.01230	0.00520	0.16	OK
N+3.45	2	COMDERUMB MAX	0.00560	0.00560	0.00792	0.23	OK
N+3.45	2	COMDERUMB MIN	-0.00560	-0.00560	0.00792	0.23	OK
N+3.45	2	COMDERUMB2 MAX	0.00350	0.00780	0.00855	0.24	OK
N+3.45	2	COMDERUMB2 MIN	-0.00350	-0.00780	0.00855	0.24	OK
BASE	2	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	2	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	2	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	2	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+3.45	3	COMDERUMB MAX	0.00530	0.00370	0.00646	0.18	OK
N+3.45	3	COMDERUMB MIN	-0.00530	-0.00370	0.00646	0.18	OK
N+3.45	3	COMDERUMB2 MAX	0.00420	0.00640	0.00766	0.22	OK
N+3.45	3	COMDERUMB2 MIN	-0.00420	-0.00640	0.00766	0.22	OK
BASE	3	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	3	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	3	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	3	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+3.45	4	COMDERUMB MAX	0.00530	0.00560	0.00771	0.22	OK
N+3.45	4	COMDERUMB MIN	-0.00530	-0.00560	0.00771	0.22	OK
N+3.45	4	COMDERUMB2 MAX	0.00420	0.00780	0.00886	0.25	OK
N+3.45	4	COMDERUMB2 MIN	-0.00420	-0.00780	0.00886	0.25	OK
BASE	4	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	4	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	4	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	4	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+6.65	5	COMDERUMB MAX	0.01000	0.00470	0.00444	0.14	OK
N+6.65	5	COMDERUMB MIN	-0.01000	-0.00470	0.00444	0.14	OK
N+6.65	5	COMDERUMB2 MAX	0.00550	0.00920	0.00402	0.13	OK
N+6.65	5	COMDERUMB2 MIN	-0.00550	-0.00920	0.00402	0.13	OK
N+3.45	5	COMDERUMB MAX	0.00590	0.00300	0.00662	0.19	OK
N+3.45	5	COMDERUMB MIN	-0.00590	-0.00300	0.00662	0.19	OK
N+3.45	5	COMDERUMB2 MAX	0.00320	0.00590	0.00671	0.19	OK
N+3.45	5	COMDERUMB2 MIN	-0.00320	-0.00590	0.00671	0.19	OK
BASE	5	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	5	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	5	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	5	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+6.65	6	COMDERUMB MAX	0.01040	0.00860	0.00516	0.16	OK
N+6.65	6	COMDERUMB MIN	-0.01040	-0.00860	0.00516	0.16	OK
N+6.65	6	COMDERUMB2 MAX	0.00500	0.01230	0.00497	0.16	OK
N+6.65	6	COMDERUMB2 MIN	-0.00500	-0.01230	0.00497	0.16	OK
N+3.45	6	COMDERUMB MAX	0.00620	0.00560	0.00835	0.24	OK
N+3.45	6	COMDERUMB MIN	-0.00620	-0.00560	0.00835	0.24	OK
N+3.45	6	COMDERUMB2 MAX	0.00290	0.00780	0.00832	0.24	OK
N+3.45	6	COMDERUMB2 MIN	-0.00290	-0.00780	0.00832	0.24	OK
BASE	6	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	6	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	6	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	6	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+6.65	7	COMDERUMB MAX	0.01040	0.00570	0.00465	0.15	OK
N+6.65	7	COMDERUMB MIN	-0.01040	-0.00570	0.00465	0.15	OK
N+6.65	7	COMDERUMB2 MAX	0.00500	0.01000	0.00417	0.13	OK
N+6.65	7	COMDERUMB2 MIN	-0.00500	-0.01000	0.00417	0.13	OK

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, CLL 17 N°3N-102

CÁLCULO DE DERIVAS MÁXIMAS (ESPECTRO DE UMBRAL DE DAÑO)

ALTURA DE N+6.65 3.20 m			Deriva Máxima Permitida 0.40 %				
ALTURA DE N+3.45 3.50 m							
ALTURA DE BASE 0.00 m							
N+3.45	7	COMDERUMB MAX	0.00620	0.00370	0.00722	0.21	OK
N+3.45	7	COMDERUMB MIN	-0.00620	-0.00370	0.00722	0.21	OK
N+3.45	7	COMDERUMB2 MAX	0.00290	0.00640	0.00703	0.20	OK
N+3.45	7	COMDERUMB2 MIN	-0.00290	-0.00640	0.00703	0.20	OK
BASE	7	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	7	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	7	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	7	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+6.65	8	COMDERUMB MAX	0.01040	0.00390	0.00443	0.14	OK
N+6.65	8	COMDERUMB MIN	-0.01040	-0.00390	0.00443	0.14	OK
N+6.65	8	COMDERUMB2 MAX	0.00500	0.00840	0.00358	0.11	OK
N+6.65	8	COMDERUMB2 MIN	-0.00500	-0.00840	0.00358	0.11	OK
N+3.45	8	COMDERUMB MAX	0.00620	0.00250	0.00669	0.19	OK
N+3.45	8	COMDERUMB MIN	-0.00620	-0.00250	0.00669	0.19	OK
N+3.45	8	COMDERUMB2 MAX	0.00290	0.00550	0.00622	0.18	OK
N+3.45	8	COMDERUMB2 MIN	-0.00290	-0.00550	0.00622	0.18	OK
BASE	8	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	8	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	8	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	8	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+6.65	9	COMDERUMB MAX	0.01040	0.00560	0.00461	0.14	OK
N+6.65	9	COMDERUMB MIN	-0.01040	-0.00560	0.00461	0.14	OK
N+6.65	9	COMDERUMB2 MAX	0.00500	0.00870	0.00366	0.11	OK
N+6.65	9	COMDERUMB2 MIN	-0.00500	-0.00870	0.00366	0.11	OK
N+3.45	9	COMDERUMB MAX	0.00620	0.00370	0.00722	0.21	OK
N+3.45	9	COMDERUMB MIN	-0.00620	-0.00370	0.00722	0.21	OK
N+3.45	9	COMDERUMB2 MAX	0.00290	0.00570	0.00640	0.18	OK
N+3.45	9	COMDERUMB2 MIN	-0.00290	-0.00570	0.00640	0.18	OK
BASE	9	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	9	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	9	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	9	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+6.65	10	COMDERUMB MAX	0.01040	0.00810	0.00499	0.16	OK
N+6.65	10	COMDERUMB MIN	-0.01040	-0.00810	0.00499	0.16	OK
N+6.65	10	COMDERUMB2 MAX	0.00500	0.00940	0.00383	0.12	OK
N+6.65	10	COMDERUMB2 MIN	-0.00500	-0.00940	0.00383	0.12	OK
N+3.45	10	COMDERUMB MAX	0.00620	0.00540	0.00822	0.23	OK
N+3.45	10	COMDERUMB MIN	-0.00620	-0.00540	0.00822	0.23	OK
N+3.45	10	COMDERUMB2 MAX	0.00290	0.00620	0.00684	0.20	OK
N+3.45	10	COMDERUMB2 MIN	-0.00290	-0.00620	0.00684	0.20	OK
BASE	10	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	10	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	10	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	10	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+6.65	11	COMDERUMB MAX	0.01100	0.00810	0.00508	0.16	OK
N+6.65	11	COMDERUMB MIN	-0.01100	-0.00810	0.00508	0.16	OK
N+6.65	11	COMDERUMB2 MAX	0.00490	0.00940	0.00372	0.12	OK
N+6.65	11	COMDERUMB2 MIN	-0.00490	-0.00940	0.00372	0.12	OK
N+3.45	11	COMDERUMB MAX	0.00670	0.00540	0.00861	0.25	OK
N+3.45	11	COMDERUMB MIN	-0.00670	-0.00540	0.00861	0.25	OK
N+3.45	11	COMDERUMB2 MAX	0.00300	0.00620	0.00689	0.20	OK
N+3.45	11	COMDERUMB2 MIN	-0.00300	-0.00620	0.00689	0.20	OK
BASE	11	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	11	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	11	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	11	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+6.65	12	COMDERUMB MAX	0.01100	0.00560	0.00470	0.15	OK
N+6.65	12	COMDERUMB MIN	-0.01100	-0.00560	0.00470	0.15	OK
N+6.65	12	COMDERUMB2 MAX	0.00490	0.00870	0.00355	0.11	OK
N+6.65	12	COMDERUMB2 MIN	-0.00490	-0.00870	0.00355	0.11	OK
N+3.45	12	COMDERUMB MAX	0.00670	0.00370	0.00765	0.22	OK
N+3.45	12	COMDERUMB MIN	-0.00670	-0.00370	0.00765	0.22	OK
N+3.45	12	COMDERUMB2 MAX	0.00300	0.00570	0.00644	0.18	OK
N+3.45	12	COMDERUMB2 MIN	-0.00300	-0.00570	0.00644	0.18	OK
BASE	12	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	12	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	12	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	12	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+6.65	13	COMDERUMB MAX	0.01100	0.00390	0.00452	0.14	OK
N+6.65	13	COMDERUMB MIN	-0.01100	-0.00390	0.00452	0.14	OK
N+6.65	13	COMDERUMB2 MAX	0.00490	0.00840	0.00347	0.11	OK

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, CLL 17 N°3N-102

CÁLCULO DE DERIVAS MÁXIMAS (ESPECTRO DE UMBRAL DE DAÑO)

ALTURA DE N+6.65 3.20 m				Deriva Máxima Permitida 0.40 %			
ALTURA DE N+3.45 3.50 m							
ALTURA DE BASE 0.00 m							
N+6.65	13	COMDERUMB2 MIN	-0.00490	-0.00840	0.00347	0.11	OK
N+3.45	13	COMDERUMB MAX	0.00670	0.00250	0.00715	0.20	OK
N+3.45	13	COMDERUMB MIN	-0.00670	-0.00250	0.00715	0.20	OK
N+3.45	13	COMDERUMB2 MAX	0.00300	0.00550	0.00626	0.18	OK
N+3.45	13	COMDERUMB2 MIN	-0.00300	-0.00550	0.00626	0.18	OK
BASE	13	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	13	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	13	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	13	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+6.65	14	COMDERUMB MAX	0.01100	0.00570	0.00474	0.15	OK
N+6.65	14	COMDERUMB MIN	-0.01100	-0.00570	0.00474	0.15	OK
N+6.65	14	COMDERUMB2 MAX	0.00490	0.01000	0.00407	0.13	OK
N+6.65	14	COMDERUMB2 MIN	-0.00490	-0.01000	0.00407	0.13	OK
N+3.45	14	COMDERUMB MAX	0.00670	0.00370	0.00765	0.22	OK
N+3.45	14	COMDERUMB MIN	-0.00670	-0.00370	0.00765	0.22	OK
N+3.45	14	COMDERUMB2 MAX	0.00300	0.00640	0.00707	0.20	OK
N+3.45	14	COMDERUMB2 MIN	-0.00300	-0.00640	0.00707	0.20	OK
BASE	14	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	14	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	14	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	14	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+6.65	15	COMDERUMB MAX	0.01100	0.00860	0.00524	0.16	OK
N+6.65	15	COMDERUMB MIN	-0.01100	-0.00860	0.00524	0.16	OK
N+6.65	15	COMDERUMB2 MAX	0.00490	0.01230	0.00488	0.15	OK
N+6.65	15	COMDERUMB2 MIN	-0.00490	-0.01230	0.00488	0.15	OK
N+3.45	15	COMDERUMB MAX	0.00670	0.00560	0.00873	0.25	OK
N+3.45	15	COMDERUMB MIN	-0.00670	-0.00560	0.00873	0.25	OK
N+3.45	15	COMDERUMB2 MAX	0.00300	0.00780	0.00836	0.24	OK
N+3.45	15	COMDERUMB2 MIN	-0.00300	-0.00780	0.00836	0.24	OK
BASE	15	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	15	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	15	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	15	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+6.65	16	COMDERUMB MAX	0.01230	0.00810	0.00542	0.17	OK
N+6.65	16	COMDERUMB MIN	-0.01230	-0.00810	0.00542	0.17	OK
N+6.65	16	COMDERUMB2 MAX	0.00540	0.00940	0.00383	0.12	OK
N+6.65	16	COMDERUMB2 MIN	-0.00540	-0.00940	0.00383	0.12	OK
N+3.45	16	COMDERUMB MAX	0.00760	0.00540	0.00932	0.27	OK
N+3.45	16	COMDERUMB MIN	-0.00760	-0.00540	0.00932	0.27	OK
N+3.45	16	COMDERUMB2 MAX	0.00330	0.00620	0.00702	0.20	OK
N+3.45	16	COMDERUMB2 MIN	-0.00330	-0.00620	0.00702	0.20	OK
BASE	16	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	16	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	16	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	16	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+6.65	17	COMDERUMB MAX	0.01350	0.00560	0.00544	0.17	OK
N+6.65	17	COMDERUMB MIN	-0.01350	-0.00560	0.00544	0.17	OK
N+6.65	17	COMDERUMB2 MAX	0.00590	0.00870	0.00372	0.12	OK
N+6.65	17	COMDERUMB2 MIN	-0.00590	-0.00870	0.00372	0.12	OK
N+3.45	17	COMDERUMB MAX	0.00840	0.00370	0.00918	0.26	OK
N+3.45	17	COMDERUMB MIN	-0.00840	-0.00370	0.00918	0.26	OK
N+3.45	17	COMDERUMB2 MAX	0.00370	0.00570	0.00680	0.19	OK
N+3.45	17	COMDERUMB2 MIN	-0.00370	-0.00570	0.00680	0.19	OK
BASE	17	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	17	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	17	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	17	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+6.65	18	COMDERUMB MAX	0.01350	0.00390	0.00529	0.17	OK
N+6.65	18	COMDERUMB MIN	-0.01350	-0.00390	0.00529	0.17	OK
N+6.65	18	COMDERUMB2 MAX	0.00590	0.00840	0.00364	0.11	OK
N+6.65	18	COMDERUMB2 MIN	-0.00590	-0.00840	0.00364	0.11	OK
N+3.45	18	COMDERUMB MAX	0.00840	0.00250	0.00876	0.25	OK
N+3.45	18	COMDERUMB MIN	-0.00840	-0.00250	0.00876	0.25	OK
N+3.45	18	COMDERUMB2 MAX	0.00370	0.00550	0.00663	0.19	OK
N+3.45	18	COMDERUMB2 MIN	-0.00370	-0.00550	0.00663	0.19	OK
BASE	18	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	18	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	18	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	18	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+6.65	19	COMDERUMB MAX	0.01350	0.00570	0.00548	0.17	OK
N+6.65	19	COMDERUMB MIN	-0.01350	-0.00570	0.00548	0.17	OK

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, CLL 17 N°3N-102

CÁLCULO DE DERIVAS MÁXIMAS (ESPECTRO DE UMBRAL DE DAÑO)

ALTURA DE N+6.65	3.20	m		Deriva Máxima Permitida	0.40	%	
ALTURA DE N+3.45	3.50	m					
ALTURA DE BASE	0.00	m					
N+6.65	19	COMDERUMB2 MAX	0.00590	0.01000	0.00422	0.13	OK
N+6.65	19	COMDERUMB2 MIN	-0.00590	-0.01000	0.00422	0.13	OK
N+3.45	19	COMDERUMB MAX	0.00840	0.00370	0.00918	0.26	OK
N+3.45	19	COMDERUMB MIN	-0.00840	-0.00370	0.00918	0.26	OK
N+3.45	19	COMDERUMB2 MAX	0.00370	0.00640	0.00739	0.21	OK
N+3.45	19	COMDERUMB2 MIN	-0.00370	-0.00640	0.00739	0.21	OK
BASE	19	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	19	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	19	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	19	COMDERUMB2 MIN	0.00000	0.00000	--	--	--
N+6.65	20	COMDERUMB MAX	0.01350	0.00860	0.00592	0.18	OK
N+6.65	20	COMDERUMB MIN	-0.01350	-0.00860	0.00592	0.18	OK
N+6.65	20	COMDERUMB2 MAX	0.00590	0.01230	0.00501	0.16	OK
N+6.65	20	COMDERUMB2 MIN	-0.00590	-0.01230	0.00501	0.16	OK
N+3.45	20	COMDERUMB MAX	0.00840	0.00560	0.01010	0.29	OK
N+3.45	20	COMDERUMB MIN	-0.00840	-0.00560	0.01010	0.29	OK
N+3.45	20	COMDERUMB2 MAX	0.00370	0.00780	0.00863	0.25	OK
N+3.45	20	COMDERUMB2 MIN	-0.00370	-0.00780	0.00863	0.25	OK
BASE	20	COMDERUMB MAX	0.00000	0.00000	--	--	--
BASE	20	COMDERUMB MIN	0.00000	0.00000	--	--	--
BASE	20	COMDERUMB2 MAX	0.00000	0.00000	--	--	--
BASE	20	COMDERUMB2 MIN	0.00000	0.00000	--	--	--

PROYECTO: I.E. BARRIO OBRERO
VERIFICACIÓN DE INDICE DE ESTABILIDAD Qi

DESPLAZAMIENTO DE DIAFRAGMAS RIGIDOS

NIVEL	Diaphragm	COMBINACIÓN	DESPLAZAMIENTOS FUERZA SÍSMICA		Deriva Δ
		DE CARGA	Desplazamiento X	Desplazamiento Y	m
N+6.65	D1	COMDER1 MAX	0.0869	0.0291	0.040
N+6.65	D1	COMDER1 MIN	-0.0869	-0.0291	0.040
N+6.65	D1	COMDER2 MAX	0.0377	0.065	0.031
N+6.65	D1	COMDER2 MIN	-0.0377	-0.065	0.031
N+3.45	D1	COMDER1 MAX	0.0479	0.0183	0.051
N+3.45	D1	COMDER1 MIN	-0.0479	-0.0183	0.051
N+3.45	D1	COMDER2 MAX	0.0206	0.0393	0.044
N+3.45	D1	COMDER2 MIN	-0.0206	-0.0393	0.044

FUERZA CORTANTE DEL PISO i

PISO	Fx kN	Vi kN
N+6.65	480.9	480.90
N+3.45	1191.9	1672.80

CÁLCULO DE CARGA MUERTA POR NIVEL

NIVEL	Área	Carga Muerta kN	Acumulado Carga Muerta	Carga Viva kN/m ²	Carga Viva kN	Acumulado Carga Viva	Sumatoria de Cargas
N+6.65	396.84	88.66	88.66	0.35	138.89	138.89	227.55
N+3.45	403.72	311.48	311.48	2.45	989.11	989.11	1300.60

INDICE DE ESTABILIDAD

$$Q_i = \frac{P_i \Delta_{cm}}{V_i H_{pi}}$$

Donde:

Pi Suma de la carga vertical total, incluyendo muerta y viva, que existe en el piso i, y todos los pisos localizados por encima. Para el cálculo de los efectos P-Delta, no hay necesidad que los coeficientes de carga sean mayores que la unidad.

Δ_{cm} Deriva del piso i, en la dirección bajo estudio, medida en el centro de masa del piso, como la diferencia entre el desplazamiento horizontal del piso i menos el del piso i-1.

Vi Fuerza cortante del piso, en la dirección bajo estudio, sin dividir por R. Se determina por medio de la ecuación A.3-2. Corresponde a la suma de las fuerzas horizontales sísmicas que se aplican en el nivel i, y todos los niveles localizados por encima de él.

Hpi Altura del piso i, medida desde la superficie del diafragma del piso i hasta la superficie del diafragma del piso inmediatamente inferior i-1.

VERIFICACIÓN DE ESTABILIDAD

$$Q_i(x) = \frac{P_i \Delta_{cm}}{V_i H_{pi}}$$

NIVEL	COMBINACIÓN	Hpi	Pi	Δ_{cm}	Vi	Qi	ESTABILIDAD
	DE CARGA	m	kN	m	kN		Qi<0.10
N+6.65	COMDER1 MAX	3.20	227.551	0.040	480.900	0.0060	ESTABLE
N+6.65	COMDER1 MIN	3.20	227.551	0.040	480.900	0.0060	ESTABLE
N+6.65	COMDER2 MAX	3.20	227.551	0.031	480.900	0.0046	ESTABLE
N+6.65	COMDER2 MIN	3.20	227.551	0.031	480.900	0.0046	ESTABLE
N+3.45	COMDER1 MAX	3.50	1300.596	0.051	1672.800	0.0114	ESTABLE
N+3.45	COMDER1 MIN	3.50	1300.596	0.051	1672.800	0.0114	ESTABLE
N+3.45	COMDER2 MAX	3.50	1300.596	0.044	1672.800	0.0099	ESTABLE
N+3.45	COMDER2 MIN	3.50	1300.596	0.044	1672.800	0.0099	ESTABLE

4. DISEÑO DE CIMENTACIÓN

DISEÑO DE CIMENTACIÓN

PROYECTO: I. E BARRIO OBRERO IPIALES (NARIÑO)
ELECCIÓN DE CARGAS PARA DISEÑO DE CIMENTACIÓN

Combinaciones de carga	NSR-10	F.S.
Cargas Gravitacionales:	CIMEN= 1D + 1L	B.2.3-2
Cargas por Estado Limite de Servicio	CIMEN2= 1D + 0.75L + 0.70*(0.75/R)Ex + 0.21*(0.75/R)Ex + 0.70*(0.75/R)Ex + 0.21*(0.75/R)Ex + 0.70*(0.75/R)Ex	B.2.3-8
		1.50

Story	Point	Load	FX	FY	FZ	MX	MY	MZ	Load	COMBINACIÓN	Pumax
BASE	1	CIMEN	26.81	-10.14	323.74	10.25	29.447	0.042	CIMEN		
BASE	1	CIMEN2 MAX	41.27	3.35	317.38	34.821	61.001	1.007	CIMEN2 MAX		
BASE	1	CIMEN2 MIN	9.97	-22.85	308.36	-15	-4.797	-0.927	CIMEN2 MIN	CIMEN	323.7
BASE	1	CIMEN3 MAX	35.7	12.02	317.69	52.241	49.279	0.781	CIMEN3 MAX		
BASE	1	CIMEN3 MIN	15.53	-31.51	308.06	-32.42	6.926	-0.701	CIMEN3 MIN		
BASE	2	CIMEN	-29.47	-9.47	327.98	9.239	-34.987	0.042	CIMEN		
BASE	2	CIMEN2 MAX	-12.79	9.62	328.25	45.475	-0.879	1.007	CIMEN2 MAX		
BASE	2	CIMEN2 MIN	-43.56	-27.94	306.08	-27.453	-66.075	-0.927	CIMEN2 MIN	CIMEN	328.0
BASE	2	CIMEN3 MAX	-18.31	17.16	324.56	60.28	-12.555	0.781	CIMEN3 MAX		
BASE	2	CIMEN3 MIN	-38.04	-35.47	309.77	-42.258	-54.398	-0.701	CIMEN3 MIN		
BASE	3	CIMEN	6.32	-4.24	44.62	3.496	5.775	0.042	CIMEN		
BASE	3	CIMEN2 MAX	20.34	6.08	50.81	25.188	35.903	1.007	CIMEN2 MAX		
BASE	3	CIMEN2 MIN	-7.94	-14.42	37.03	-18.138	-24.553	-0.927	CIMEN2 MIN	CIMEN	44.6
BASE	3	CIMEN3 MAX	17.85	14.27	55.01	42.052	30.531	0.781	CIMEN3 MAX		
BASE	3	CIMEN3 MIN	-5.44	-22.61	32.83	-35.002	-19.18	-0.701	CIMEN3 MIN		
BASE	4	CIMEN	-9.28	-4.09	45.73	3.079	-12.085	0.042	CIMEN		
BASE	4	CIMEN2 MAX	5.05	11.99	53.39	36.422	18.391	1.007	CIMEN2 MAX		
BASE	4	CIMEN2 MIN	-23.21	-20.02	36.59	-30.174	-42.038	-0.927	CIMEN2 MIN	CIMEN	45.7
BASE	4	CIMEN3 MAX	2.57	18.47	52.61	50.011	13.041	0.781	CIMEN3 MAX		
BASE	4	CIMEN3 MIN	-20.74	-26.5	37.37	-43.763	-36.688	-0.701	CIMEN3 MIN		
BASE	5	CIMEN	10.19	-31.78	244.54	35.114	10.531	0.042	CIMEN		
BASE	5	CIMEN2 MAX	25.82	-20.51	245.74	49.939	44.123	1.007	CIMEN2 MAX		
BASE	5	CIMEN2 MIN	-6.09	-37.53	215.35	14.173	-23.77	-0.927	CIMEN2 MIN	CIMEN	244.5
BASE	5	CIMEN3 MAX	18.69	-12.01	245.22	67.565	29.031	0.781	CIMEN3 MAX		
BASE	5	CIMEN3 MIN	1.04	-46.03	215.87	-3.453	-8.678	-0.701	CIMEN3 MIN		
BASE	6	CIMEN	-25.89	16.35	254.73	-20.314	-30.64	0.042	CIMEN		
BASE	6	CIMEN2 MAX	-7.92	35.45	274.26	18.156	6.518	1.007	CIMEN2 MAX		
BASE	6	CIMEN2 MIN	-40.2	-4.07	210.94	-57.024	-63.598	-0.927	CIMEN2 MIN	CIMEN	254.7
BASE	6	CIMEN3 MAX	-16.42	43.55	279.31	33.604	-11.908	0.781	CIMEN3 MAX		
BASE	6	CIMEN3 MIN	-31.7	-12.17	205.89	-72.472	-45.172	-0.701	CIMEN3 MIN		
BASE	7	CIMEN	-6.64	17.14	441.87	-20.984	-8.605	0.042	CIMEN		
BASE	7	CIMEN2 MAX	13.19	29.25	431.73	4.685	30.682	1.007	CIMEN2 MAX		
BASE	7	CIMEN2 MIN	-24.73	3.48	395.08	-44.659	-45.885	-0.927	CIMEN2 MIN	CIMEN	441.9
BASE	7	CIMEN3 MAX	3.73	39.61	435.61	24.033	11.164	0.781	CIMEN3 MAX		
BASE	7	CIMEN3 MIN	-15.27	-6.87	391.21	-64.007	-26.367	-0.701	CIMEN3 MIN		
BASE	8	CIMEN	10.57	1.56	205.15	-2.892	11.098	0.042	CIMEN		
BASE	8	CIMEN2 MAX	27.69	9.96	205.7	13.766	47.271	1.007	CIMEN2 MAX		
BASE	8	CIMEN2 MIN	-8.45	-6.96	176.67	-19.236	-27.247	-0.927	CIMEN2 MIN	CIMEN	205.2
BASE	8	CIMEN3 MAX	17.92	19.85	222.45	33.087	27.395	0.781	CIMEN3 MAX		
BASE	8	CIMEN3 MIN	1.32	-16.84	159.91	-38.557	-7.371	-0.701	CIMEN3 MIN		
BASE	9	CIMEN	-3.62	0.66	159.42	-1.628	-5.154	0.042	CIMEN		
BASE	9	CIMEN2 MAX	14.91	12.94	171.21	22.274	32.649	1.007	CIMEN2 MAX		
BASE	9	CIMEN2 MIN	-21.63	-11.55	125.89	-25.437	-42.342	-0.927	CIMEN2 MIN	CIMEN	159.4
BASE	9	CIMEN3 MAX	5.36	19.96	184.62	36.018	13.03	0.781	CIMEN3 MAX		
BASE	9	CIMEN3 MIN	-12.09	-18.57	112.47	-39.181	-22.723	-0.701	CIMEN3 MIN		
BASE	10	CIMEN	11.43	-0.88	102.07	0.39	12.078	0.042	CIMEN		
BASE	10	CIMEN2 MAX	25.7	16.76	133.36	34.877	44.993	1.007	CIMEN2 MAX		
BASE	10	CIMEN2 MIN	-5.3	-18.46	59.65	-34.042	-23.64	-0.927	CIMEN2 MIN	CIMEN	102.1
BASE	10	CIMEN3 MAX	17.64	19.85	135.88	40.952	27.084	0.781	CIMEN3 MAX		
BASE	10	CIMEN3 MIN	2.75	-21.55	57.12	-40.117	-5.73	-0.701	CIMEN3 MIN		
BASE	11	CIMEN	19.99	-1.6	204.31	1.208	21.959	0.042	CIMEN		
BASE	11	CIMEN2 MAX	34.9	18.55	206.07	38.75	56.798	1.007	CIMEN2 MAX		
BASE	11	CIMEN2 MIN	1.84	-21.84	182.56	-36.086	-16.57	-0.927	CIMEN2 MIN	CIMEN	204.3
BASE	11	CIMEN3 MAX	25.8	22.12	209.92	45.384	36.596	0.781	CIMEN3 MAX		
BASE	11	CIMEN3 MIN	10.95	-25.42	178.71	-42.72	3.633	-0.701	CIMEN3 MIN		
BASE	12	CIMEN	-0.42	-18.82	465.92	20.677	-1.408	0.042	CIMEN		
BASE	12	CIMEN2 MAX	20	-4.86	459.19	44.929	39.752	1.007	CIMEN2 MAX		
BASE	12	CIMEN2 MIN	-20.82	-31.34	418.52	-5.055	-42.52	-0.927	CIMEN2 MIN	CIMEN	465.9
BASE	12	CIMEN3 MAX	8.8	3	468.07	59.64	17.148	0.781	CIMEN3 MAX		
BASE	12	CIMEN3 MIN	-9.62	-39.21	409.64	-19.766	-19.915	-0.701	CIMEN3 MIN		
BASE	13	CIMEN	4.29	-18.47	483.74	20.034	3.993	0.042	CIMEN		
BASE	13	CIMEN2 MAX	23.73	-8.34	466.15	36.688	44.014	1.007	CIMEN2 MAX		

PROYECTO: I. E BARRIO OBRERO IPIALES (NARIÑO)
ELECCIÓN DE CARGAS PARA DISEÑO DE CIMENTACIÓN

Combinaciones de carga

Cargas Gravitacionales:

Cargas por Estado Limite de Servicio

CIMEN= 1D + 1L

CIMEN2= 1D + 0.75L + 0.70*(0.75/R)Ex + 0.21*(0.75/R)

CIMEN3= 1D + 0.75L + 0.21*(0.75/R)Ex + 0.70*(0.75/R)

NSR-10

B.2.3-2

B.2.3-8

F.S.

3.00

1.50

Story	Point	Load	FX	FY	FZ	MX	MY	MZ	Load	COMBINACIÓN	Pumax
BASE	13	CIMEN2 MIN	-16.03	-26.98	441.3	1.713	-37.035	-0.927	CIMEN2 MIN	CIMEN	483.7
BASE	13	CIMEN3 MAX	12.72	2.56	480.58	57.169	21.632	0.781	CIMEN3 MAX		
BASE	13	CIMEN3 MIN	-5.02	-37.88	426.88	-18.769	-14.653	-0.701	CIMEN3 MIN		
BASE	14	CIMEN	-4.27	-19.67	474.01	21.161	-5.812	0.042	CIMEN		
BASE	14	CIMEN2 MAX	16.29	-5.42	462.89	45.579	35.497	1.007	CIMEN2 MAX		
BASE	14	CIMEN2 MIN	-24.13	-32.24	425.89	-4.966	-46.305	-0.927	CIMEN2 MIN	CIMEN	474.0
BASE	14	CIMEN3 MAX	5.26	4.59	472.59	64.54	13.097	0.781	CIMEN3 MAX		
BASE	14	CIMEN3 MIN	-13.1	-42.26	416.18	-23.927	-23.905	-0.701	CIMEN3 MIN		
BASE	15	CIMEN	-26.06	-12.19	259.15	12.354	-30.758	0.042	CIMEN		
BASE	15	CIMEN2 MAX	-6.82	8.41	264.75	50.229	9.043	1.007	CIMEN2 MAX		
BASE	15	CIMEN2 MIN	-41.54	-32.09	228.2	-26.071	-66.234	-0.927	CIMEN2 MIN	CIMEN	259.2
BASE	15	CIMEN3 MAX	-16.42	16.47	280.3	65.63	-11.735	0.781	CIMEN3 MAX		
BASE	15	CIMEN3 MIN	-31.94	-40.15	212.65	-41.472	-45.455	-0.701	CIMEN3 MIN		
BASE	16	CIMEN	21.55	4.34	164.71	-5.595	23.882	0.042	CIMEN		
BASE	16	CIMEN2 MAX	39.08	20.65	173.16	27.987	64.119	1.007	CIMEN2 MAX		
BASE	16	CIMEN2 MIN	2.12	-12.44	147.46	-38.499	-18.535	-0.927	CIMEN2 MIN	CIMEN	164.7
BASE	16	CIMEN3 MAX	28.8	23.6	177.9	33.905	41.045	0.781	CIMEN3 MAX		
BASE	16	CIMEN3 MIN	12.41	-15.39	142.73	-44.416	4.539	-0.701	CIMEN3 MIN		
BASE	17	CIMEN	23.65	28.18	351.93	-33.127	26.385	0.042	CIMEN		
BASE	17	CIMEN2 MAX	45.9	37.98	348.44	-9.119	74.064	1.007	CIMEN2 MAX		
BASE	17	CIMEN2 MIN	-0.86	15.86	330.54	-54.084	-23.889	-0.927	CIMEN2 MIN	CIMEN	351.9
BASE	17	CIMEN3 MAX	32.98	43.63	348.11	3.069	46.939	0.781	CIMEN3 MAX		
BASE	17	CIMEN3 MIN	12.06	10.21	330.87	-66.273	3.236	-0.701	CIMEN3 MIN		
BASE	18	CIMEN	-1.63	22.9	540.26	-27.326	-2.546	0.042	CIMEN		
BASE	18	CIMEN2 MAX	24.73	28.92	522.67	-10.546	49.833	1.007	CIMEN2 MAX		
BASE	18	CIMEN2 MIN	-27.9	14.28	513.41	-40.927	-54.845	-0.927	CIMEN2 MIN	CIMEN	540.3
BASE	18	CIMEN3 MAX	10.19	37.41	525.98	7.185	20.861	0.781	CIMEN3 MAX		
BASE	18	CIMEN3 MIN	-13.36	5.79	510.11	-58.658	-25.872	-0.701	CIMEN3 MIN		
BASE	19	CIMEN	0.69	23.38	539.81	-28.118	0.108	0.042	CIMEN		
BASE	19	CIMEN2 MAX	27.14	32.62	525.73	-4.463	52.591	1.007	CIMEN2 MAX		
BASE	19	CIMEN2 MIN	-25.92	11.47	509.45	-48.514	-52.573	-0.927	CIMEN2 MIN	CIMEN	539.8
BASE	19	CIMEN3 MAX	12.48	40.5	527.6	12.05	23.478	0.781	CIMEN3 MAX		
BASE	19	CIMEN3 MIN	-11.25	3.6	507.57	-65.026	-23.46	-0.701	CIMEN3 MIN		
BASE	20	CIMEN	-28.22	16.84	296.52	-20.874	-32.986	0.042	CIMEN		
BASE	20	CIMEN2 MAX	-4.03	31.97	298.09	13.185	16.905	1.007	CIMEN2 MAX		
BASE	20	CIMEN2 MIN	-49.8	0.27	275.03	-53.03	-79.905	-0.927	CIMEN2 MIN	CIMEN	296.5
BASE	20	CIMEN3 MAX	-16.62	38.11	298.3	26.393	-9.839	0.781	CIMEN3 MAX		
BASE	20	CIMEN3 MIN	-37.2	-5.87	274.82	-66.238	-53.161	-0.701	CIMEN3 MIN		

CARGAS A CIMENTACIÓN

PROYECTO: I. E BARRIO OBRERO IPIALES (NARIÑO)

Story	Point	Load	FX	FY	FZ	MX	MY	MZ
BASE	1	CIMEN	26.810	-10.140	323.740	10.250	29.447	0.042
BASE	2	CIMEN	-29.470	-9.470	327.980	9.239	-34.987	0.042
BASE	3	CIMEN	6.320	-4.240	44.620	3.496	5.775	0.042
BASE	4	CIMEN	-9.280	-4.090	45.730	3.079	-12.085	0.042
BASE	5	CIMEN	10.190	-31.780	244.540	35.114	10.531	0.042
BASE	6	CIMEN	-25.890	16.350	254.730	-20.314	-30.640	0.042
BASE	7	CIMEN	-6.640	17.140	441.870	-20.984	-8.605	0.042
BASE	8	CIMEN	10.570	1.560	205.150	-2.892	11.098	0.042
BASE	9	CIMEN	-3.620	0.660	159.420	-1.628	-5.154	0.042
BASE	10	CIMEN	11.430	-0.880	102.070	0.390	12.078	0.042
BASE	11	CIMEN	19.990	-1.600	204.310	1.208	21.959	0.042
BASE	12	CIMEN	-0.420	-18.820	465.920	20.677	-1.408	0.042
BASE	13	CIMEN	4.290	-18.470	483.740	20.034	3.993	0.042
BASE	14	CIMEN	-4.270	-19.670	474.010	21.161	-5.812	0.042
BASE	15	CIMEN	-26.060	-12.190	259.150	12.354	-30.758	0.042
BASE	16	CIMEN	21.550	4.340	164.710	-5.595	23.882	0.042
BASE	17	CIMEN	23.650	28.180	351.930	-33.127	26.385	0.042
BASE	18	CIMEN	-1.630	22.900	540.260	-27.326	-2.546	0.042
BASE	19	CIMEN	0.690	23.380	539.810	-28.118	0.108	0.042
BASE	20	CIMEN	-28.220	16.840	296.520	-20.874	-32.986	0.042

DISEÑO VIGAS DE AMARRE

PROYECTO: I. E BARRIO OBRERO IPIALES (NARIÑO)

VIGA DE AMARRE TIPO

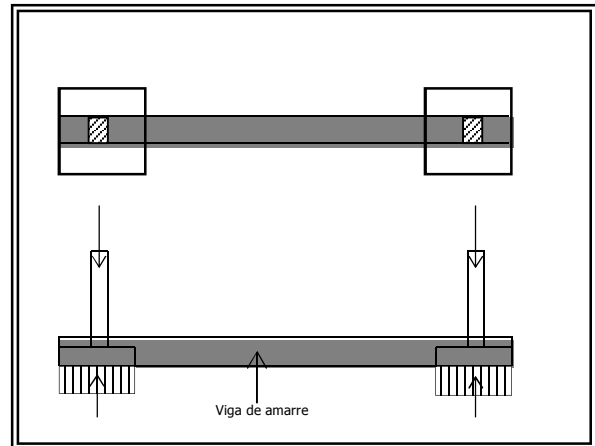
$$f'_c = \boxed{21.1} \text{ MPa}$$
$$f_y = \boxed{420} \text{ MPa}$$

$$b = \boxed{0.30} \text{ m}$$
$$h = \boxed{0.40} \text{ m}$$

$$P_{\text{máx}} = \mathbf{540.26 \text{ kN}}$$

De acuerdo a el numeral A.3.6.4.2 de la NSR-10 tenemos:

$$A_a = \mathbf{0.30}$$
$$P_{\text{axial}} = 0.25 * A_a * P_{\text{máx}}$$
$$P_{\text{axial}} = \mathbf{40.520 \text{ kN}}$$



DISEÑO A TENSIÓN

$$A_s = 1.7 * 40.5195 / (0.90 * 420)$$
$$A_s = \boxed{1.82} \text{ cm}^2$$

DISEÑO A COMPRESIÓN

$$P_{\text{com}} = 1.7 * 40.5195$$
$$P_{\text{com}} = \mathbf{68.9 \text{ kN}}$$

Para esta carga la sección requiere cuantía mínima:

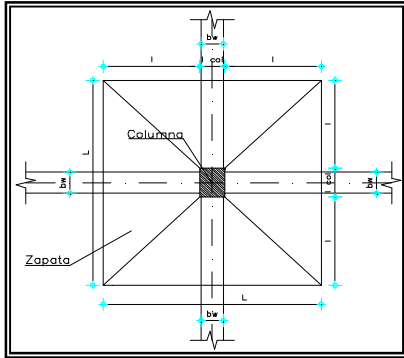
$$A_s = 0.00333 * 0.3 * 0.35$$
$$A_s = \boxed{3.50} \text{ cm}^2$$

Se suministra un refuerzo constituido por 3#4 arriba y abajo (como refuerzo mínimo).

DISEÑO DE ZAPATAS
PROYECTO: I. E BARRIO OBRERO IPIALES (NARIÑO)
Zapata Tipo 1 - Concentrica Und.11

Columna **b = 40** cm **f_c = 21.1** MPa **σ = 0.151** MPa
 t = 40 cm **f_y = 420** MPa

PREDIMENSIONAMIENTO



L = 2.000 m
l_{col} = 0.400 m
l = 0.800 m

Cargas

Mu =	0.000	kN*m
Pu =	540.26	kN
Pp (10%) =	54	kN
Σ P =	594	kN

$$\text{Area necesaria} = \frac{\Sigma P}{\sigma} = \frac{594.29}{0.151} = 3.94 \text{ m}^2$$

e = 0.00 m
L = 1.984 m *Aproximamos = 2.00* m

$$\text{Carga de diseño} = \frac{P_u}{A_{\text{real}}} = \frac{540.26}{4.000} = 0.135 \text{ MPa}$$

Esfuerzos

σ_{máx} =	0.149	MPa	OK
σ_{min} =	0.149	MPa	OK

DISEÑO DE ZAPATA CONCENTRICA

FLEXIÓN

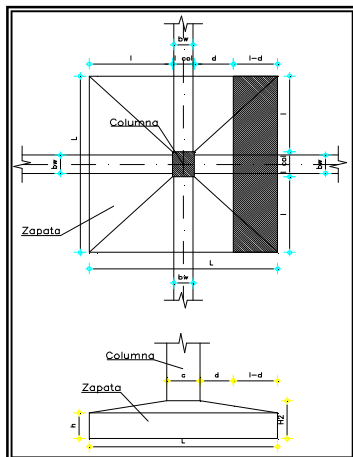
M borde de la columna = 47.54 kN*m
Mu = 1,7 * M borde de la columna = 80.82 kN*m

Con el criterio de calcular el refuerzo por metro lineal utilizamos una altura efectiva igual a:

d = 0.33 m
Cuantia = 0.002
As = 6.60 cm²/m

Armadura: 11#423c./0.19
 en ambos sentidos

CORTANTE



a. En una dirección (d)

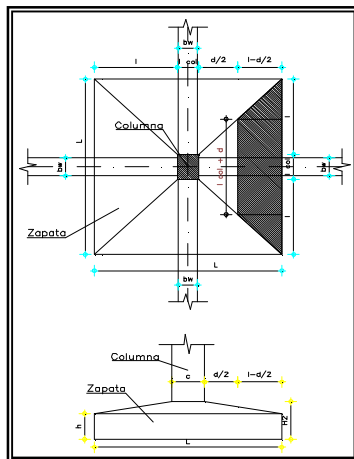
L = 2.00 m
l = 0.80 m
l - d = 0.47 m

H = 0.40 m
h = 0.30 m
H-h = 0.10 m

V (d) = 139.66 kN
Vu (d) = 1.7*V(d)
Vu (d) = 237.42 kN
h' = 0.29 m

$$\sigma_v = \frac{V_u}{L * h'} = 0.406 \text{ MPa}$$

φvc = 0.57 MPa OK



b. En dos direcciones ($d/2$)

$$\begin{aligned} L &= 2.000 \text{ m} \\ d/2 &= 0.165 \text{ m} \\ l - d/2 &= 0.635 \text{ m} \end{aligned}$$

$$\begin{aligned} V(d/2) &= 128.8 \text{ kN} \\ Vu(d/2) &= 1.5 \cdot V(d) \\ Vu(d/2) &= 193.2 \text{ kN} \\ d_1 &= 0.31466667 \text{ m} \end{aligned}$$

Zapata Tipo 1 - Concentrica

$$\begin{aligned} H &= 0.30 \text{ m} \\ h &= 0.30 \text{ m} \\ H-h &= 0.10 \text{ m} \end{aligned}$$

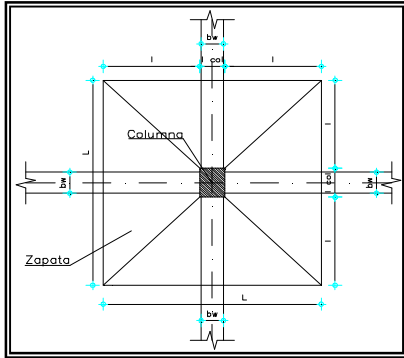
$$vu = \frac{Vu}{bo \times d_1} = 0.841 \text{ MPa}$$

$$\phi_{vc} = 1.15 \text{ MPa OK}$$

DISEÑO DE ZAPATAS
PROYECTO: I. E BARRIO OBRERO IPIALES (NARIÑO)
Zapata Tipo 2 - Concentrica Und.9

Columna **b = 40** cm **f_c = 21.1** MPa **σ = 0.151** MPa
 t = 40 cm **f_y = 420** MPa

PREDIMENSIONAMIENTO



L = 1.400 m
l_{col} = 0.400 m
l = 0.500 m

Cargas

Mu =	0.000	kN*m
Pu =	250.00	kN
Pp (10%) =	25	kN
Σ P =	275	kN

$$\text{Area necesaria} = \frac{\Sigma P}{\sigma} = \frac{275.00}{0.151} = 1.82 \text{ m}^2$$

e = 0.00 m
L = 1.350 m

Aproximamos = 1.40 m

$$\text{Carga de diseño} = \frac{P_u}{A_{\text{real}}} = \frac{250}{1.960} = 0.128 \text{ MPa}$$

Esfuerzos

σ_{máx} =	0.140	MPa	OK
σ_{min} =	0.140	MPa	OK

DISEÑO DE ZAPATA CONCENTRICA

FLEXIÓN

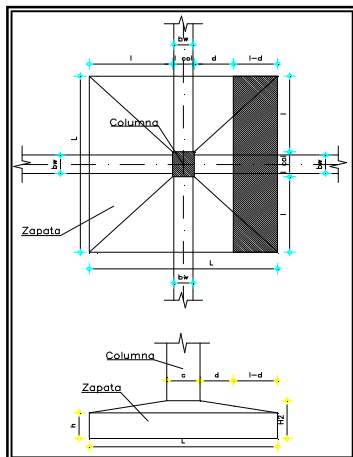
M borde de la columna = 17.54 kN*m
Mu = 1,7 * M borde de la columna = 29.82 kN*m

Con el criterio de calcular el refuerzo por metro lineal utilizamos una altura efectiva igual a:

d = 0.23 m
Cuantia = 0.002
As = 4.60 cm²/m

Armadura: 8#417c./0.20
en ambos sentidos

CORTANTE



a. En una dirección (d)

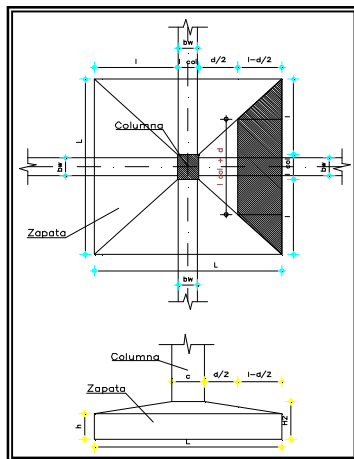
L = 1.40 m
l = 0.50 m
l - d = 0.27 m

H = 0.30 m
h = 0.30 m
H-h = 0.00 m

V (d) = 53.04 kN
Vu (d) = 1.7*V(d)
Vu (d) = 90.16 kN
h' = 0.23 m

$$v_v = \frac{V_u}{L * h'} = 0.280 \text{ MPa}$$

φvc = 0.57 MPa OK



b. En dos direcciones (d/2)

$$\begin{aligned} L &= 1.400 \text{ m} \\ d/2 &= 0.115 \text{ m} \\ l - d/2 &= 0.385 \text{ m} \end{aligned}$$

$$\begin{aligned} V(d/2) &= 54.8 \text{ kN} \\ V_u(d/2) &= 1.5 \cdot V(d) \\ V_u(d/2) &= 82.2 \text{ kN} \\ d_1 &= 0.23 \text{ m} \end{aligned}$$

Zapata Tipo 2 - Concentrica

$$\begin{aligned} H &= 0.30 \text{ m} \\ h &= 0.30 \text{ m} \\ H-h &= 0.00 \text{ m} \end{aligned}$$

$$v_u = \frac{V_u}{b_o \times d_1} = 0.568 \text{ MPa}$$

$$\phi_{vc} = 1.15 \text{ MPa OK}$$

5. DISEÑO DE VIGAS, VIGUETAS Y COLUMNAS

*DISEÑO DE VIGAS, VIGUETAS Y
COLUMNAS*

DISEÑO DE VIGAS**V-101/ N+ 3.45**

B= 0.30 H= 0.45 L= 6.55		
Mu=-40.69	Mu=-44.97	
As=3.92	As=3.92	
Mu=15.66		
As=3.92		
Vu=-22.45	Vu=10.17	Vu=23.68

V-102/ N+ 3.45

B= 0.30 H= 0.45 L= 6.55		
Mu=-35.77	Mu=-37.57	
As=3.92	As=3.92	
Mu=58.31		
As=4.06		
Vu=-41.97	Vu=-9.42	Vu=42.48

V-103/ N+ 3.45

B= 0.30 H= 0.45 L= 6.55		
Mu=-158.70	Mu=-162.54	
As=12.04	As=12.38	
Mu=125.23		
As=9.20		
Vu=-120.48	Vu=-37.51	Vu=121.58

V-104/ N+ 3.45

B= 0.30 H= 0.45 L= 2.30			B= 0.30 H= 0.45 L= 6.65		
Mu=-125.39	Mu=-31.35		Mu=-70.97	Mu=-56.89	
As=9.22	As=3.92		As=4.99	As=3.96	
Mu=31.35 As=3.92			Mu=101.44 As=7.30		
Vu=-66.92	Vu=-44.50	Vu=-22.08	Vu=-87.71	Vu=-12.35	Vu=81.86

V-106/ N+ 3.45

B= 0.30 H= 0.45 L= 6.80			B= 0.30 H= 0.45 L= 6.68			B= 0.30 H= 0.45 L= 6.93		
Mu=-95.70	Mu=-113.05		Mu=-91.80	Mu=-112.95		Mu=-175.24	Mu=-292.73	
As=6.86	As=8.22		As=6.56	As=8.21		As=13.52	As=24.10	
Mu=57.29 As=3.98			Mu=36.23 As=3.92			Mu=122.93 As=12.56		
Vu=-62.25	Vu=-16.67	Vu=69.51	Vu=-57.13	Vu=-12.01	Vu=64.23	Vu=-107.78	Vu=-53.55	Vu=211.85

B= 0.30 H= 0.45 L= 6.55		
Mu=-211.40	Mu=-154.95	
As=16.98	As=11.71	
Mu=132.30		
As=9.79		
Vu=-137.14	Vu=-60.98	Vu=115.88

DISEÑO DE VIGAS**V-107/ N+ 3.45**

B= 0.30 H= 0.45 L= 6.80			B= 0.30 H= 0.45 L= 6.68			B= 0.30 H= 0.45 L= 6.93		
Mu=-154.84	Mu=-200.01		Mu=-191.41	Mu=-206.36		Mu=-225.54	Mu=-232.39	
As=11.70	As=15.85		As=15.02	As=16.47		As=19.91	As=20.34	
Mu=116.28 As=8.48			Mu=130.10 As=9.60			Mu=170.49 As=13.09		
Vu=-111.45	Vu=-34.53	Vu=127.25	Vu=-129.15	Vu=-52.00	Vu=133.80	Vu=-150.55	Vu=-65.59	Vu=153.87

B= 0.30 H= 0.45 L= 6.55		
Mu=-214.00	Mu=-160.36	
As=17.24	As=12.18	
Mu=135.92 As=10.09		
Vu=-137.60	Vu=-62.82	Vu=118.21

V-108/ N+ 3.45

B= 0.30 H= 0.45 L= 6.80			B= 0.20 H= 0.45 L= 6.68			B= 0.20 H= 0.45 L= 6.93		
Mu=-160.51	Mu=-113.68		Mu=-99.34	Mu=-118.02		Mu=-116.44	Mu=-116.93	
As=12.20	As=8.27		As=7.46	As=9.12		As=8.98	As=9.02	
Mu=84.01 As=5.96			Mu=60.60 As=4.33			Mu=58.77 As=4.19		
Vu=-96.97	Vu=-29.64	Vu=87.65	Vu=-82.44	Vu=-7.98	Vu=87.66	Vu=-87.43	Vu=-8.93	Vu=87.54

B= 0.20 H= 0.45 L= 6.55		
Mu=-116.77	Mu=-56.24	
As=9.01	As=3.99	
Mu=65.50 As=4.82		
Vu=-88.52	Vu=-17.27	Vu=69.45

V-109/ N+ 3.45

B= 0.30 H= 0.45 L= 6.68			B= 0.30 H= 0.45 L= 6.93			B= 0.30 H= 0.45 L= 6.55		
Mu=-171.98	Mu=-220.21		Mu=-208.21	Mu=-210.55		Mu=-219.86	Mu=-167.67	
As=13.22	As=17.88		As=16.66	As=16.89		As=17.84	As=12.83	
Mu=124.67 As=9.16			Mu=119.36 As=8.73			Mu=127.46 As=9.39		
Vu=-123.69	Vu=-37.64	Vu=138.63	Vu=-132.11	Vu=-42.01	Vu=132.81	Vu=-140.36	Vu=-56.34	Vu=122.88

V-110/ N+ 3.45

B= 0.15 H= 0.45 L= 6.68			B= 0.15 H= 0.45 L= 6.93			B= 0.15 H= 0.45 L= 6.55		
Mu=-26.84	Mu=-51.12		Mu=-47.14	Mu=-48.35		Mu=-50.51	Mu=-23.40	
As=1.96	As=3.68		As=3.37	As=3.47		As=3.64	As=1.96	
Mu=26.55 As=2.03			Mu=20.95 As=1.96			Mu=25.26 As=1.96		
Vu=-28.06	Vu=6.01	Vu=35.37	Vu=-33.29	Vu=-3.50	Vu=33.49	Vu=-34.95	Vu=-7.53	Vu=26.70

DISEÑO DE VIGAS**V-111/ N+ 3.45**

B= 0.40 H= 0.45 L= 3.50			B= 0.40 H= 0.45 L= 2.10		
Mu=-81.96 As=5.72	Mu=-70.66 As=5.23		Mu=-79.03 As=5.50	Mu=-72.11 As=5.23	
Mu=27.60 As=5.23			Mu=19.76 As=5.23		
Vu=-66.95	Vu=27.36	Vu=67.61	Vu=-81.81	Vu=-60.18	Vu=64.96

V-112/ N+ 3.45

B= 0.20 H= 0.45 L= 3.75			B= 0.20 H= 0.45 L= 2.35		
Mu=-4.73 As=2.61	Mu=-27.42 As=2.61		Mu=-15.03 As=2.61	Mu=-17.86 As=2.61	
Mu=41.97 As=2.93			Mu=4.47 As=2.61		
Vu=-39.50	Vu=7.09	Vu=50.10	Vu=-21.45	Vu=-2.75	Vu=22.81

V-113/ N+ 3.45

B= 0.40 H= 0.45 L= 1.45			B= 0.40 H= 0.45 L= 6.60			B= 0.40 H= 0.45 L= 2.10		
Mu=-0.00 As=5.23	Mu=-57.16 As=5.23		Mu=-241.96 As=18.78	Mu=-228.28 As=17.53		Mu=-155.82 As=11.37	Mu=-51.38 As=5.23	
Mu=0.00 As=5.23			Mu=186.48 As=13.89			Mu=38.96 As=5.23		
Vu=28.06	Vu=35.51	Vu=42.96	Vu=-169.44	Vu=68.11	Vu=160.22	Vu=-118.60	Vu=-97.92	Vu=-77.24

V-114/ N+ 3.45

B= 0.20 H= 0.45 L= 1.50			B= 0.20 H= 0.45 L= 6.70			B= 0.20 H= 0.45 L= 2.25		
Mu=-4.37 As=2.61	Mu=-18.60 As=2.61		Mu=-38.37 As=2.67	Mu=-57.39 As=4.08		Mu=-36.69 As=2.61	Mu=-21.10 As=2.61	
Mu=0.00 As=2.61			Mu=53.43 As=4.30			Mu=9.17 As=2.61		
Vu=-4.05	Vu=8.69	Vu=17.17	Vu=-55.39	Vu=-15.30	Vu=71.37	Vu=-29.14	Vu=-8.32	Vu=15.12

V-115/ N+ 3.45

B= 0.40 H= 0.45 L= 1.45			B= 0.40 H= 0.45 L= 6.60			B= 0.40 H= 0.45 L= 2.10		
Mu=-0.00 As=5.23	Mu=-126.55 As=9.06		Mu=-253.63 As=19.88	Mu=-227.35 As=17.45		Mu=-153.64 As=11.19	Mu=-49.12 As=5.23	
Mu=0.00 As=5.23			Mu=188.57 As=14.07			Mu=38.41 As=5.23		
Vu=68.66	Vu=80.09	Vu=91.53	Vu=-180.04	Vu=67.84	Vu=161.34	Vu=-116.44	Vu=-95.76	Vu=-75.08

V-116/ N+ 3.45

B= 0.20 H= 0.45 L= 1.50			B= 0.20 H= 0.45 L= 6.70			B= 0.20 H= 0.45 L= 2.25		
Mu=-5.69 As=2.61	Mu=-17.41 As=2.61		Mu=-40.41 As=2.82	Mu=-76.16 As=5.54		Mu=-74.24 As=5.39	Mu=-0.00 As=2.61	
Mu=4.35 As=2.61			Mu=50.01 As=3.82			Mu=0.00 As=2.61		
Vu=-5.73	Vu=7.22	Vu=15.70	Vu=-55.81	Vu=-11.25	Vu=75.93	Vu=-56.56	Vu=-34.43	Vu=-14.30

DISEÑO DE VIGAS**V-117/ N+ 3.45**

B= 0.40 H= 0.45 L= 3.37		
Mu=-0.00	Mu=-225.83	
As=5.23	As=17.31	
Mu=105.95		
As=9.74		
Vu=-205.10	Vu=119.98	Vu=188.82

V-118/ N+ 3.45

B= 0.40 H= 0.45 L= 1.45			B= 0.40 H= 0.45 L= 6.70			B= 0.40 H= 0.45 L= 2.10		
Mu=-0.00		Mu=-126.39	Mu=-263.18		Mu=-230.72	Mu=-149.34		Mu=-101.09
As=5.23		As=9.05	As=20.79		As=17.76	As=10.85		As=7.13
Mu=0.00			Mu=190.03			Mu=37.33		
As=5.23			As=14.19			As=5.23		
Vu=68.45	Vu=79.88	Vu=91.31	Vu=-181.30	Vu=69.35	Vu=160.91	Vu=-91.03	Vu=-70.35	Vu=-52.50

B= 0.40 H= 0.45 L= 6.60			B= 0.40 H= 0.45 L= 5.93		
Mu=-169.37		Mu=-176.84	Mu=-134.61		Mu=-63.46
As=12.47		As=13.09	As=9.69		As=5.23
Mu=135.62 As=9.77			Mu=33.65 As=5.23		
Vu=-122.08	Vu=56.34	Vu=120.74	Vu=-85.95	Vu=-22.28	Vu=38.99

V-119/ N+ 3.45

B= 0.20 H= 0.45 L= 1.50			B= 0.20 H= 0.45 L= 6.90			B= 0.20 H= 0.45 L= 2.30		
Mu=-4.68		Mu=-22.36	Mu=-46.18		Mu=-73.76	Mu=-61.79		Mu=-61.87
As=2.61		As=2.61	As=3.24		As=5.35	As=4.42		As=4.42
Mu=0.00 As=2.61			Mu=53.51 As=4.05			Mu=15.47 As=2.61		
Vu=-3.98	Vu=10.72	Vu=19.20	Vu=-58.02	Vu=-11.09	Vu=75.96	Vu=-22.10	Vu=-1.17	Vu=22.16

B= 0.20 H= 0.45 L= 6.80			B= 0.20 H= 0.45 L= 1.35		
Mu=-74.04	Mu=-39.65		Mu=-17.82	Mu=-24.68	
As=5.38	As=2.76		As=2.61	As=2.61	
Mu=48.22 As=3.52			Mu=6.17 As=2.61		
Vu=-73.10	Vu=6.42	Vu=58.29	Vu=-3.82	Vu=4.57	Vu=12.02

V-120/ N+ 3.45

B= 0.40 H= 0.45 L= 1.45			B= 0.40 H= 0.45 L= 6.70			B= 0.40 H= 0.45 L= 2.10		
Mu=-0.00		Mu=-54.63	Mu=-179.94		Mu=-161.58	Mu=-128.61		Mu=-122.89
As=5.23		As=5.23	As=13.34		As=11.83	As=9.22		As=8.78
Mu=0.00			Mu=104.73			Mu=32.15		
As=5.23			As=7.42			As=5.23		
Vu=26.70	Vu=34.15	Vu=41.59	Vu=-117.47	Vu=36.35	Vu=111.26	Vu=-79.90	Vu=-66.32	Vu=73.68

DISEÑO DE VIGAS

B= 0.40 H= 0.45 L= 6.60			B= 0.40 H= 0.45 L= 5.93		
Mu=-167.86	Mu=-179.18		Mu=-145.84	Mu=-73.27	
As=12.35	As=13.28		As=10.57	As=5.23	
Mu=118.42 As=8.44			Mu=36.46 As=5.23		
Vu=-114.87	Vu=-43.01	Vu=120.21	Vu=-91.23	Vu=-25.08	Vu=41.94

V-202/ N+ 6.65

B= 0.15 H= 0.45 L= 6.65		
Mu=-8.81	Mu=-10.33	
As=1.96	As=1.96	
Mu=6.87		
As=1.96		
Vu=-7.68	Vu=1.17	Vu=8.09

V-203/ N+ 6.65

B= 0.30 H= 0.45 L= 6.55		
Mu=-34.21	Mu=-41.46	
As=3.92	As=3.92	
Mu=10.37		
As=3.92		
Vu=-17.92	Vu=6.40	Vu=19.91

V-204/ N+ 6.65

B= 0.30 H= 0.45 L= 2.40		
Mu=-38.83	Mu=-0.27	
As=3.92	As=3.92	
Mu=4.24		
As=3.92		
Vu=-23.22	Vu=-17.97	Vu=-12.72

V-205/ N+ 6.65

B= 0.15 H= 0.45 L= 6.78			B= 0.15 H= 0.45 L= 4.38		
Mu=-6.38	Mu=-6.98		Mu=-4.86	Mu=-8.87	
As=1.96	As=1.96		As=1.96	As=1.96	
Mu=8.28 As=1.96			Mu=2.22 As=1.96		
Vu=-7.79	Vu=0.65	Vu=8.26	Vu=-4.96	Vu=1.87	Vu=6.36

V-206/ N+ 6.65

B= 0.30 H= 0.45 L= 6.80			B= 0.30 H= 0.45 L= 6.68			B= 0.30 H= 0.45 L= 6.93		
Mu=-32.33		Mu=-36.13	Mu=-28.39		Mu=-30.28	Mu=-38.75		Mu=-38.59
As=3.92		As=3.92	As=3.92		As=3.92	As=3.92		As=3.92
Mu=9.95 As=3.92			Mu=11.28 As=3.92			Mu=13.69 As=3.92		
Vu=-17.88	Vu=5.50	Vu=19.48	Vu=-17.59	Vu=4.34	Vu=18.10	Vu=-21.10	Vu=-6.86	Vu=23.36

DISEÑO DE VIGAS

B= 0.30 H= 0.45 L= 6.55		
Mu=-26.14	Mu=-44.35	
As=3.92	As=3.92	
Mu=11.09		
As=3.92		
Vu=-16.31	Vu=7.46	Vu=20.97

V-207/ N+ 6.65

B= 0.30 H= 0.45 L= 6.80			B= 0.30 H= 0.45 L= 6.68			B= 0.30 H= 0.45 L= 6.93		
Mu=-37.48		Mu=-32.15	Mu=-30.32		Mu=-32.38	Mu=-32.89		Mu=-33.29
As=3.92		As=3.92	As=3.92		As=3.92	As=3.92		As=3.92
Mu=10.27 As=3.92			Mu=11.16 As=3.92			Mu=10.31 As=3.92		
Vu=-19.27	Vu=-5.28	Vu=18.29	Vu=-17.94	Vu=4.67	Vu=18.42	Vu=-18.37	Vu=4.33	Vu=18.52

B= 0.30 H= 0.45 L= 6.55		
Mu=-26.82	Mu=-44.83	
As=3.92	As=3.92	
Mu=11.21		
As=3.92		
Vu=-16.47	Vu=7.63	Vu=21.14

V-208/ N+ 6.65

B= 0.30 H= 0.45 L= 6.90		
Mu=-43.98	Mu=-10.99	
As=3.92	As=3.92	
Mu=14.06		
As=3.92		
Vu=-20.73	Vu=-6.73	Vu=13.09

V-209/ N+ 6.65

B= 0.30 H= 0.45 L= 6.68			B= 0.30 H= 0.45 L= 6.93			B= 0.30 H= 0.45 L= 6.55		
Mu=-39.61 As=3.92		Mu=-34.84 As=3.92	Mu=-32.67 As=3.92		Mu=-34.38 As=3.92	Mu=-31.10 As=3.92		Mu=-45.32 As=3.92
Mu=9.90 As=3.92			Mu=11.97 As=3.92			Mu=11.33 As=3.92		
Vu=-19.78	Vu=-6.02	Vu=18.84	Vu=-18.67	Vu=4.91	Vu=19.15	Vu=-17.61	Vu=7.65	Vu=21.16

V-210/ N+ 6.65

B= 0.15 H= 0.45 L= 6.78			B= 0.15 H= 0.45 L= 7.03			B= 0.15 H= 0.45 L= 6.65		
Mu=-9.47		Mu=-11.38	Mu=-10.33		Mu=-10.04	Mu=-10.56		Mu=-10.55
As=1.96		As=1.96	As=1.96		As=1.96	As=1.96		As=1.96
Mu=5.97			Mu=5.49			Mu=5.52		
As=1.96			As=1.96			As=1.96		
Vu=-7.45	Vu=1.35	Vu=8.60	Vu=-8.34	Vu=-0.57	Vu=8.28	Vu=-8.21	Vu=-1.18	Vu=7.55

DISEÑO DE VIGAS**V-211/ N+ 6.65**

B= 0.30 H= 0.45 L= 3.50			B= 0.30 H= 0.45 L= 2.10		
Mu=-29.43 As=3.92	Mu=-24.34 As=3.92		Mu=-24.11 As=3.92	Mu=-26.65 As=3.92	
Mu=7.69 As=3.92			Mu=6.66 As=3.92		
Vu=-25.57	Vu=-9.89	Vu=24.25	Vu=-27.69	Vu=-17.64	Vu=26.58

V-213/ N+ 6.65

B= 0.30 H= 0.45 L= 1.46			B= 0.30 H= 0.45 L= 6.60			B= 0.30 H= 0.45 L= 2.10		
Mu=-0.28 As=3.92	Mu=-23.84 As=3.92		Mu=-70.05 As=4.92	Mu=-51.10 As=3.92		Mu=-22.16 As=3.92	Mu=-45.81 As=3.92	
Mu=0.00 As=3.92			Mu=29.73 As=3.92			Mu=11.45 As=3.92		
Vu=7.45	Vu=14.28	Vu=21.47	Vu=-43.60	Vu=4.42	Vu=43.04	Vu=-22.38	Vu=25.24	Vu=39.00

B= 0.30 H= 0.45 L= 2.10		
Mu=-36.85 As=3.92	Mu=-0.20 As=3.92	
Mu=0.00 As=3.92		
Vu=-26.15	Vu=-16.53	Vu=-7.79

V-215/ N+ 6.65

B= 0.30 H= 0.45 L= 1.46			B= 0.30 H= 0.45 L= 6.60			B= 0.30 H= 0.45 L= 2.10		
Mu=-0.00 As=3.92	Mu=-44.26 As=3.92		Mu=-70.35 As=4.94	Mu=-46.60 As=3.92		Mu=-19.65 As=3.92	Mu=-48.62 As=3.92	
Mu=0.00 As=3.92			Mu=24.89 As=3.92			Mu=12.15 As=3.92		
Vu=16.94	Vu=26.98	Vu=38.31	Vu=-47.33	Vu=-6.63	Vu=40.68	Vu=-18.94	Vu=27.11	Vu=40.94

B= 0.30 H= 0.45 L= 2.10		
Mu=-50.04 As=3.92	Mu=-0.00 As=3.92	
Mu=0.00 As=3.92		
Vu=-35.41	Vu=-23.15	Vu=-12.95

V-217/ N+ 6.65

B= 0.30 H= 0.45 L= 3.37		
Mu=-1.54 As=3.92	Mu=-46.11 As=3.92	
Mu=6.85 As=3.92		
Vu=-11.24	Vu=12.84	Vu=30.77

DISEÑO DE VIGAS**V-218/ N+ 6.65**

B= 0.30 H= 0.45 L= 1.45			B= 0.30 H= 0.45 L= 6.60			B= 0.30 H= 0.45 L= 2.10		
Mu=-0.00 As=3.92		Mu=-43.43 As=3.92	Mu=-72.39 As=5.09		Mu=-52.35 As=3.92	Mu=-33.51 As=3.92		Mu=-25.21 As=3.92
Mu=0.00 As=3.92			Mu=23.54 As=3.92			Mu=8.38 As=3.92		
Vu=16.49	Vu=26.48	Vu=37.69	Vu=-46.44	Vu=-6.88	Vu=41.11	Vu=-34.76	Vu=-21.00	Vu=29.17

B= 0.30 H= 0.45 L= 6.60			B= 0.30 H= 0.45 L= 1.50		
Mu=-47.18 As=3.92		Mu=-50.76 As=3.92	Mu=-22.71 As=3.92		Mu=-0.11 As=3.92
Mu=20.03 As=3.92			Mu=0.00 As=3.92		
Vu=-34.73	Vu=9.86	Vu=32.80	Vu=-20.57	Vu=-14.03	Vu=-7.68

V-220/ N+ 6.65

B= 0.30 H= 0.45 L= 1.45			B= 0.30 H= 0.45 L= 6.60			B= 0.30 H= 0.45 L= 2.10		
Mu=-0.27 As=3.92		Mu=-23.92 As=3.92	Mu=-59.19 As=4.12		Mu=-44.52 As=3.92	Mu=-37.95 As=3.92		Mu=-30.92 As=3.92
Mu=0.00 As=3.92			Mu=17.18 As=3.92			Mu=9.49 As=3.92		
Vu=7.55	Vu=14.36	Vu=21.47	Vu=-34.76	Vu=-7.00	Vu=31.35	Vu=-34.94	Vu=-25.02	Vu=30.05

B= 0.30 H= 0.45 L= 6.60			B= 0.30 H= 0.45 L= 1.50		
Mu=-50.87 As=3.92		Mu=-54.84 As=3.92	Mu=-23.39 As=3.92		Mu=-0.13 As=3.92
Mu=18.80 As=3.92			Mu=0.00 As=3.92		
Vu=-33.79	Vu=-6.02	Vu=33.57	Vu=-21.01	Vu=-14.43	Vu=-8.09

PROYECTO: I . E. BARRIO OBRERO

Columna D-2

Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuantia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+6.65	2.75	.45	.40	.40	48.94	5.54	-69.10	42.79	23.59	12/#5 #6 (1.7%)	0.31	2.95	1.28
					-88.18	15.02				12/#5 #6 (1.7%)	0.57		
N+3.45	3.05	.45	.40	.40	48.07	-93.96	-388.97	61.03	53.31	12/#5 #6 (1.7%)	0.69	2.42	1.29
		1.00			-74.60	-68.60				12/#5 #6 (1.7%)	0.70		

Columnas D-1, E-1

Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuantia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+3.45	3.05	.45	.40	.40	49.68	36.15	-31.86	34.43	40.16	12/#5 #6 (1.7%)	0.43	2.90	1.39
		1.00			-54.19	-69.17				12/#5 #6 (1.7%)	0.62		

Columnas E-3, E-2, C'-2', A-4, E-4

Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuantia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+6.65	2.75	.45	.40	.40	-15.69	75.56	-48.94	37.50	51.01	12/#5 #6 (1.7%)	0.51	2.54	1.27
					65.30	-87.72				12/#5 #6 (1.7%)	0.77		
N+3.45	3.05	.45	.40	.40	-49.22	127.85	-226.04	60.35	72.16	12/#5 #6 (1.7%)	0.87	2.01	1.42
		1.00			101.86	47.93				12/#5 #6 (1.7%)	0.73		

Columnas D-3, D-4

Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuantia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+6.65	2.75	.45	.40	.40	7.74	66.09	-73.63	27.33	46.66	12/#8 #7 (3.5%)	0.28	2.26	2.10
					4.29	-83.28				12/#8 #7 (3.5%)	0.33		
N+3.45	3.05	.45	.40	.40	11.73	116.54	-465.19	43.39	64.22	12/#8 #7 (3.5%)	0.50	1.20	1.73
		1.00			-26.22	-108.23				12/#8 #7 (3.5%)	0.52		

PROYECTO: I . E. BARRIO OBRERO**Columna C-3**

Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuántia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+6.65	2.75	.45	.40	.40	37.80	29.49	-96.59	25.94	21.64	12/#6 (2.1%)	0.31	1.63	1.63
					-45.41	-19.88				12/#6 (2.1%)	0.30		
N+3.45	3.05	.45 1.00	.40	.40	51.59	57.10	-175.45	46.34	36.76	12/#6 (2.1%)	0.49	1.30	1.91
					-83.42	-34.78				12/#6 (2.1%)	0.53		

Columnas B-3, E-6

Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuántia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+6.65	2.75	.45	.40	.40	29.71	25.07	-78.89	19.78	17.00	12/#5 #6 (1.7%)	0.27	1.38	1.37
					28.66	3.11				12/#5 #6 (1.7%)	0.18		
N+3.45	3.05	.45 1.00	.40	.40	-58.95	-35.26	-225.77	38.94	37.52	12/#5 #6 (1.7%)	0.46	1.70	1.64
					77.36	43.52				12/#5 #6 (1.7%)	0.60		

Columna A-3

Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuántia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+6.65	2.75	.45	.40	.40	31.47	16.89	-19.92	20.62	13.76	12/#5 #4 (1.3%)	0.29	2.00	2.29
					-38.11	4.26				12/#5 #4 (1.3%)	0.31		
N+3.45	3.05	.45 1.00	.40	.40	69.17	48.64	-47.83	42.25	40.46	12/#5 #4 (1.3%)	0.71	2.77	3.13
					-78.74	-65.15				12/#5 #4 (1.3%)	0.83		

Columna B-4

Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuántia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+6.65	2.75	.45	.40	.40	-35.89	-55.83	-95.23	18.72	48.50	12/#7 #6 (2.7%)	0.38	1.85	1.85
					12.95	87.47				12/#7 #6 (2.7%)	0.43		
N+3.45	3.05	.45 1.00	.40	.40	-57.81	-93.48	-576.18	39.38	62.21	12/#7 #6 (2.7%)	0.66	1.63	1.32
					80.02	71.82				12/#7 #6 (2.7%)	0.66		

PROYECTO: I . E. BARRIO OBRERO**Columna C-4**

Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuántia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+6.65	2.75	.45	.40	.40	-30.86	-49.65	-87.41	19.16	47.50	12/#6 #7 (2.4%)	0.34	1.77	1.77
					-0.31	86.53				12/#6 #7 (2.4%)	0.42		
N+3.45	3.05	.45	.40	.40	-12.23	-114.39	-607.62	42.66	60.02	12/#6 #7 (2.4%)	0.58	1.24	1.32
		1.00			72.80	56.68				12/#6 #7 (2.4%)	0.56		

Columna A-5

Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuántia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+6.65	2.75	.45	.40	.40	44.01	28.08	-42.48	32.43	17.16	12/#4 #5 (1.1%)	0.45	2.04	2.04
					-71.27	-22.37				12/#4 #5 (1.1%)	0.65		
N+3.45	3.05	.45	.40	.40	104.60	58.14	-169.65	60.30	42.16	12/#4 #5 (1.1%)	0.97	1.80	3.01
		1.00			-106.50	-69.76				12/#4 #5 (1.1%)	1.03		

Columnas B-6, C-6, D-6

Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuántia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+6.65	2.75	.45	.40	.40	52.59	44.47	-83.60	40.19	40.41	12/#7 #8 (3.2%)	0.35	4.18	2.23
					-76.74	-84.51				12/#7 #8 (3.2%)	0.59		
N+3.45	3.05	.45	.40	.40	128.15	107.28	-395.32	72.01	64.64	12/#7 #8 (3.2%)	0.88	3.40	1.32
		1.00			-123.91	-81.36				12/#7 #8 (3.2%)	0.76		

6. DISEÑO DE ELEMENTOS COMPLEMENTARIOS

*DISEÑO DE ELEMENTOS
COMPLEMENTARIOS*

PROYECTO: IE BARRIO OBRERO
DISEÑO PLACA MACIZA ENTREPISO - SALONES DE CLASE

El diseño de la placa maciza se realiza de acuerdo con lo establecido en C.13.9 de las NSR - 10

Caso 1	Caso 2	Caso 3	Caso 4	Caso 5	Geometría de la losa $l_a = 3.18$ m $f_y = 420$ MPa $l_b = 3.70$ m $f'_c = 21.1$ MPa Relación $m = 0.86$ 0.85 Espesor escogido: 0.10 m
l_b					
l_a					
Caso 6	Caso 7	Caso 8	Caso 9		

Teniendo en cuenta que la relación m es mayor de 0.5, la placa maciza trabaja en dos direcciones

Cargas

Peso propio de la losa	0.1x1.0x24	2.40	kN/m ²
Muros divisorios		2.00	kN/m ²
Acabados	0.05x20	1.10	kN/m ²
Carga Muerta Total		5.50	kN/m²
Carga Viva		2.00	kN/m²
Carga Última		9.80	kN/m²

Tipo de soporte CASO N° 8

DISEÑO A MOMENTO FLECTOR

Coefficientes para momento positivo por carga muerta y viva:

$C_{oD} =$	0.029	1			
$C_{oB} =$	0.017				
$C_{oV} =$	0.040				
$C_{oV} =$	0.022				
$M_{ua} =$	2.42	kN.m	Cuantía:	0.0020	$A_s = 1.40$ cm ² /m
$M_{ub} =$	1.88	kN.m	Cuantía:	0.0020	$A_s = 1.40$ cm ² /m

Coefficientes para momento negativo por carga última:

$C_a =$	0.049	$M_{ua} = 4.86$	kN.m	Cuantía:	0.0024	$A_s = 1.70$ cm ² /m
$C_b =$	0.046	$M_{ub} = 6.17$	kN.m	Cuantía:	0.0031	$A_s = 2.18$ cm ² /m

Distribución de refuerzo inferior:

Sentido L_a Malla electrosoldada \emptyset 6.5 mm c/.15 inferior

Sentido L_b Malla electrosoldada \emptyset 6.5 mm c/.15 inferior

Distribución de refuerzo superior:

Sentido L_a Malla electrosoldada \emptyset 6.5 mm c/.15 superior

Sentido L_b Malla electrosoldada \emptyset 6.5 mm c/.15 superior

REVISIÓN A CORTANTE

Coefficientes de relación de carga en las dos direcciones para cortante:

$W_a =$	0.61		
$W_b =$	0.39		
$\phi_{VC} =$	0.574	MPa	
$\phi_{Vu_a} =$	0.111	MPa	OK
$\phi_{Vu_b} =$	0.061	MPa	OK

PROYECTO: IE BARRIO OBRERO
DISEÑO PLACA MACIZA PASILLO- ESCALERA

El diseño de la placa maciza se realiza de acuerdo con lo establecido en C.13.9 de las NSR - 10

Caso 1	Caso 2	Caso 3	Caso 4	Caso 5	Geometría de la losa
l_b					
l_a					la = 2.25 m fy = 420 MPa
					lb = 3.36 m f'c = 21.1 MPa
					Relación m = 0.67
					0.65
					Espesor escogido: 0.10 m

Teniendo en cuenta que la relación m es mayor de 0.5, la placa maciza trabaja en dos direcciones

Cargas

Peso propio de la losa	0.1x1.0x24	2.40	kN/m ²
Muros divisorios		0.00	kN/m ²
Acabados	0.05x20	1.10	kN/m ²
Carga Muerta Total		3.50	kN/m²
Carga Viva		5.00	kN/m²
Carga Última		12.20	kN/m²

Tipo de soporte CASO N° 8

DISEÑO A MOMENTO FLECTOR

Coefficientes para momento positivo por carga muerta y viva:

C _{oD} =	0.044	1		
C _{oB} =	0.009			
C _{oV} =	0.059			
C _{oV} =	0.011			
M _{ua} =	2.27	kN.m	Cuantía:	0.0020 As = 1.40 cm ² /m
M _{ub} =	0.98	kN.m	Cuantía:	0.0020 As = 1.40 cm ² /m

Coefficientes para momento negativo por carga última:

C _a =	0.074	M _{ua} = 4.57	kN.m	Cuantía:	0.0023	As = 1.60 cm ² /m
C _b =	0.024	M _{ub} = 3.31	kN.m	Cuantía:	0.0020	As = 1.40 cm ² /m

Distribución de refuerzo inferior:

Sentido La Malla electrosoldada Ø 6.5 mm c/.15 inferior

Sentido Lb Malla electrosoldada Ø 6.5 mm c/.15 inferior

Distribución de refuerzo superior:

Sentido La Malla electrosoldada Ø 6.5 mm c/.15 superior

Sentido Lb Malla electrosoldada Ø 6.5 mm c/.15 superior






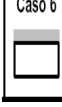
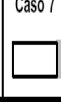
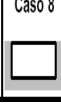

REVISIÓN A CORTANTE

Coefficientes de relación de carga en las dos direcciones para cortante:

W _a =	0.61		
W _b =	0.39		
φ _{VC} =	0.574	MPa	
φ _{VU_a} =	0.125	MPa	OK
φ _{VU_b} =	0.054	MPa	OK

PROYECTO: IE BARRIO OBRERO
DISEÑO PLACA MACIZA (EN UNA DIRECCIÓN) TANQUE

El diseño de la placa maciza se realiza de acuerdo con lo establecido en C.13.9 de las NSR - 10

Caso 1	Caso 2	Caso 3	Caso 4	Caso 5	Geometría de la losa la = 2.93 m fy = 420 MPa lb = 6.80 m f'c = 21.1 MPa Relación m = 0.4
					
Caso 6	Caso 7	Caso 8	Caso 9		
					

$h = l/20 (0.4 + f_y/700) = 0.15 \text{ m}$

Espesor escogido: 0.15 m

Teniendo en cuenta que la relación m es menor de 0.5, la placa maciza trabaja en una dirección

Cargas

Peso propio de la losa	0.15x1.0x24	3.60	kN/m ²
Muros divisorios		0.00	kN/m ²
Acabados	0.05x20	1.10	kN/m ²
Carga Muerta Total		4.70	kN/m ²
Carga Viva		5.00	kN/m ²
Carga Última		13.64	kN/m ²

DISEÑO A MOMENTO FLECTOR

Mu _b = 14.64 kN.m	Cuantía: 0.0025	As = 2.99 cm ² /m	Transversal
	Cuantía: 0.0018	As = 2.16 cm ² /m	Longitudinal

Distribución de refuerzo:

1#4 c/.0.2 Transversal
1#4 c/.0.2 Longitudinal

REVISIÓN A CORTANTE

Coefficientes de relación de carga en las dos direcciones para cortante:

R = 19.98 kN

φ _{VC} = 0.574 MPa	
φ _{VU} = 0.167 MPa	OK

Proyecto: _____ Fecha: _____

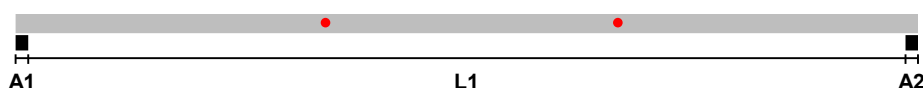
Ingeniero: _____ Firma: _____

Elementos calculados con el programa de diseño Arquimet 2.0 de ACESCO

REPORTE DE CORREAS

PHR C con atiesador 203 x 67 x 19 (2.00 mm)
con $F_y = 35.15 \text{ Kg/mm}^2$ cada 1.20 m con arriostramiento cada $L/3$.

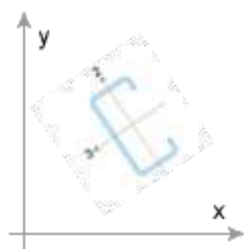
SECCION LONGITUDINAL



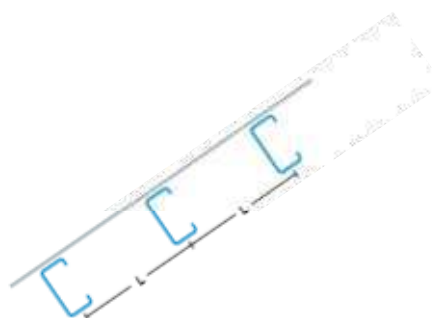
L1	6.97 m
A1	0.10 m
A2	0.10 m

CONFIGURACION	
TIPO DE CARGA	DISTRIBUIDA
Carga muerta	0.20 KN/m ²
Peso propio correa	0.06 KN/m
Carga viva	0.35 KN/m ²
Carga granizo	0.50 KN/m ²
Viento compresión (Perpendicular)	0.40 KN/m ²
Viento succión (Perpendicular)	0.40 KN/m ²
Pendiente sección transversal	34.5° = 68.7280%

SECCION TRANSVERSAL



$L = 1.20 \text{ m}$



Proyecto: _____ Fecha: _____

Ingeniero: _____ Firma: _____

Elementos calculados con el programa de diseño Arquimet 2.0 de ACESCO

REPORTES DE DISEÑO

REPORTE FLEXION				
	Apoyos		Interiores	
Ejes locales	3	2	3	2
Resistente (KN.m)	13.1139	2.4559	10.1018	2.4559
Calculado (KN.m)	4.9646E-06	2.1452E-07	8.2663	0.4134

REPORTE CORTANTE		
Ejes locales	2	3
Resistente (KN)	39.4813	41.6581
Calculado (KN)	4.6686	0.8379

REPORTE DEFLEXION		
Deflexiones máximas	Instantanea	Permanente
Admisible (m)	0.0262	0.0000
Calculado (m)	0.0127	0.0000

Memorias de Cálculo

PROGRAMA DE DISEÑO Y CALCULO ESTRUCTURAL ARQUIMET 2.0

Proyecto: _____ Fecha: _____

Ingeniero: _____ Firma: _____

Elementos calculados con el programa de diseño Arquimet 2.0 de ACESCO

COMBINACIONES DE CARGA

No	Muerta	Viva	Granizo	Viento compresión	Viento succión
1	1.4000	0.0000	0.0000	0.0000	0.0000
2	1.2000	0.5000	0.0000	0.0000	0.0000
3	1.2000	0.0000	0.5000	0.0000	0.0000
4	1.2000	1.6000	0.0000	0.5000	0.0000
5	1.2000	0.0000	1.6000	0.5000	0.0000
6	1.2000	1.6000	0.0000	0.0000	0.5000
7	1.2000	0.0000	1.6000	0.0000	0.5000
8	1.2000	0.5000	0.0000	0.0000	1.0000
9	1.2000	0.0000	0.5000	0.0000	1.0000
10	1.2000	0.5000	0.0000	1.0000	0.0000
11	1.2000	0.0000	0.5000	1.0000	0.0000
12	0.9000	0.0000	0.0000	0.0000	1.0000
13	0.9000	0.0000	0.0000	1.0000	0.0000

Memorias de Cálculo

PROGRAMA DE DISEÑO Y CALCULO ESTRUCTURAL ARQUIMET 2.0

Proyecto: _____ Fecha: _____

Ingeniero: _____ Firma: _____

REACCIONES - EJES GLOBALES (KN-m)

Elementos calculados con el programa de diseño Arquimet 2.0 de ACESCO

APOYO 1		
Combinacion	Rx	Ry
Muerta	-0.3571	0.7978
Viva de Cub.	-0.5082	1.1354
Granizo	-0.7260	1.6220
Viento Comp.	-0.9611	1.3984
Viento Succion	0.9611	-1.3984
Comb. 1	-0.5000	1.1169
Comb. 2	-0.6826	1.5250
Comb. 3	-0.7916	1.7683
Comb. 4	-1.7222	3.4732
Comb. 5	-2.0707	4.2517
Comb. 6	-1.7222	3.4732
Comb. 7	-2.0707	4.2517
Comb. 8	-1.6437	2.9234
Comb. 9	-1.7526	3.1667
Comb. 10	-1.6437	2.9234
Comb. 11	-1.7526	3.1667
Comb. 12	-1.2825	2.1164
Comb. 13	-1.2825	2.1164

APOYO 2		
Combinacion	Rx	Ry
Muerta	-0.3571	0.7978
Viva de Cub.	-0.5082	1.1354
Granizo	-0.7260	1.6220
Viento Comp.	-0.9611	1.3984
Viento Succion	0.9611	-1.3984
Comb. 1	-0.5000	1.1169
Comb. 2	-0.6826	1.5251
Comb. 3	-0.7916	1.7684
Comb. 4	-1.7222	3.4732
Comb. 5	-2.0707	4.2517
Comb. 6	-1.7222	3.4732
Comb. 7	-2.0707	4.2517
Comb. 8	-1.6437	2.9234
Comb. 9	-1.7526	3.1667
Comb. 10	-1.6437	2.9234
Comb. 11	-1.7526	3.1667
Comb. 12	-1.2825	2.1164
Comb. 13	-1.2825	2.1164

Memorias de Cálculo

PROGRAMA DE DISEÑO Y CALCULO ESTRUCTURAL ARQUIMET 2.0

Proyecto: _____ Fecha: _____

Ingeniero: _____ Firma: _____

FUERZAS INTERNAS - EJES LOCALES (KN-m)

Elementos calculados con el programa de diseño Arquimet 2.0 de ACESCO

APOYO 1				
Combinacion	R2	R3	M2	M3
Muerta	0.1576	0.8597	-1.9154E-08	6.8953E-07
Viva de Cub.	0.2243	1.2236	-2.8730E-08	-1.8196E-07
Granizo	0.3204	1.7480	-1.9154E-08	-2.8730E-07
Viento Comp.	0.0000	1.6968	0.0000	2.8730E-07
Viento Succion	0.0000	1.6968	0.0000	2.8730E-07
Comb. 1	0.2206	1.2036	-2.6815E-08	9.6534E-07
Comb. 2	0.3012	1.6435	-3.7350E-08	7.3646E-07
Comb. 3	0.3493	1.9057	-3.2561E-08	6.8378E-07
Comb. 4	0.5479	3.8378	-6.8953E-08	6.7995E-07
Comb. 5	0.7017	4.6769	-5.3630E-08	5.1140E-07
Comb. 6	0.5479	3.8378	-6.8953E-08	6.7995E-07
Comb. 7	0.7017	4.6769	-5.3630E-08	5.1140E-07
Comb. 8	0.3012	3.3403	-3.7350E-08	1.0238E-06
Comb. 9	0.3493	3.6025	-3.2561E-08	9.7109E-07
Comb. 10	0.3012	3.3403	-3.7350E-08	1.0238E-06
Comb. 11	0.3493	3.6025	-3.2561E-08	9.7109E-07
Comb. 12	0.1418	2.4706	-1.7238E-08	9.0788E-07
Comb. 13	0.1418	2.4706	-1.7238E-08	9.0788E-07

APOYO 2				
Combinacion	R2	R3	M2	M3
Muerta	0.1576	0.8597	-3.8307E-08	1.8387E-06
Viva de Cub.	0.2243	1.2236	-1.0534E-07	7.6614E-07
Granizo	0.3204	1.7480	-7.6614E-08	1.5323E-06
Viento Comp.	0.0000	1.6968	0.0000	6.1292E-07
Viento Succion	0.0000	1.6968	0.0000	6.1292E-07
Comb. 1	0.2206	1.2036	-5.3630E-08	2.5742E-06
Comb. 2	0.3012	1.6435	-9.8641E-08	2.5896E-06
Comb. 3	0.3493	1.9057	-8.4276E-08	2.9726E-06
Comb. 4	0.5479	3.8378	-2.1452E-07	3.7388E-06
Comb. 5	0.7017	4.6769	-1.6855E-07	4.9646E-06
Comb. 6	0.5479	3.8378	-2.1452E-07	3.7388E-06
Comb. 7	0.7017	4.6769	-1.6855E-07	4.9646E-06
Comb. 8	0.3012	3.3403	-9.8641E-08	3.2025E-06
Comb. 9	0.3493	3.6025	-8.4276E-08	3.5856E-06
Comb. 10	0.3012	3.3403	-9.8641E-08	3.2025E-06
Comb. 11	0.3493	3.6025	-8.4276E-08	3.5856E-06
Comb. 12	0.1418	2.4706	-3.4477E-08	2.2678E-06
Comb. 13	0.1418	2.4706	-3.4477E-08	2.2678E-06

Proyecto: _____ Fecha: _____

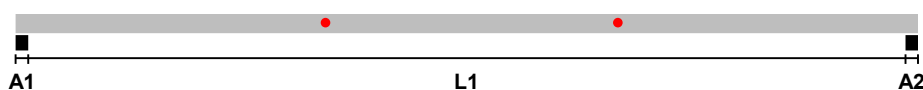
Ingeniero: _____ Firma: _____

Elementos calculados con el programa de diseño Arquimet 2.0 de ACESCO

REPORTE DE CORREAS

PHR C con atiesador 203 x 67 x 19 (2.50 mm)
con $F_y = 35.15 \text{ Kg/mm}^2$ cada 1.53 m con arriostramiento cada $L/3$.

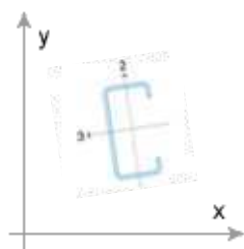
SECCION LONGITUDINAL



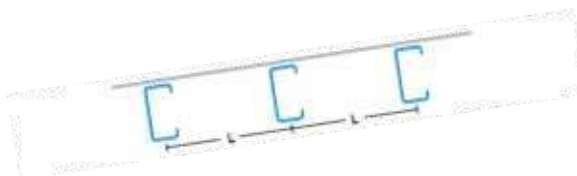
L1	6.97 m
A1	0.10 m
A2	0.10 m

CONFIGURACION	
TIPO DE CARGA	DISTRIBUIDA
Carga muerta	0.20 KN/m ²
Peso propio correa	0.07 KN/m
Carga viva	0.50 KN/m ²
Carga granizo	0.50 KN/m ²
Viento compresión (Perpendicular)	0.40 KN/m ²
Viento succión (Perpendicular)	0.40 KN/m ²
Pendiente sección transversal	8.6° = 15.1240%

SECCION TRANSVERSAL



$L = 1.53 \text{ m}$



Memorias de Cálculo

PROGRAMA DE DISEÑO Y CALCULO ESTRUCTURAL ARQUIMET 2.0

Proyecto: _____ Fecha: _____

Ingeniero: _____ Firma: _____

Elementos calculados con el programa de diseño Arquimet 2.0 de ACESCO

REPORTES DE DISEÑO

REPORTE FLEXION				
	Apoyos		Interiores	
Ejes locales	3	2	3	2
Resistente (KN.m)	16.7759	3.0682	12.7961	3.0682
Calculado (KN.m)	3.9533E-06	1.5323E-08	12.2532	0.1390

REPORTE CORTANTE		
Ejes locales	2	3
Resistente (KN)	68.9342	51.0902
Calculado (KN)	6.9203	0.2818

REPORTE DEFLEXION		
Deflexiones máximas	Instantanea	Permanente
Admisible (m)	0.0262	0.0000
Calculado (m)	0.0225	0.0000

Memorias de Cálculo

PROGRAMA DE DISEÑO Y CALCULO ESTRUCTURAL ARQUIMET 2.0

Proyecto: _____ Fecha: _____

Ingeniero: _____ Firma: _____

Elementos calculados con el programa de diseño Arquimet 2.0 de ACESCO

COMBINACIONES DE CARGA

No	Muerta	Viva	Granizo	Viento compresión	Viento succión
1	1.4000	0.0000	0.0000	0.0000	0.0000
2	1.2000	0.5000	0.0000	0.0000	0.0000
3	1.2000	0.0000	0.5000	0.0000	0.0000
4	1.2000	1.6000	0.0000	0.5000	0.0000
5	1.2000	0.0000	1.6000	0.5000	0.0000
6	1.2000	1.6000	0.0000	0.0000	0.5000
7	1.2000	0.0000	1.6000	0.0000	0.5000
8	1.2000	0.5000	0.0000	0.0000	1.0000
9	1.2000	0.0000	0.5000	0.0000	1.0000
10	1.2000	0.5000	0.0000	1.0000	0.0000
11	1.2000	0.0000	0.5000	1.0000	0.0000
12	0.9000	0.0000	0.0000	0.0000	1.0000
13	0.9000	0.0000	0.0000	1.0000	0.0000

Memorias de Cálculo

PROGRAMA DE DISEÑO Y CALCULO ESTRUCTURAL ARQUIMET 2.0

Proyecto: _____ Fecha: _____

Ingeniero: _____ Firma: _____

REACCIONES - EJES GLOBALES (KN-m)

Elementos calculados con el programa de diseño Arquimet 2.0 de ACESCO

APOYO 1		
Combinacion	Rx	Ry
Muerta	-0.1437	1.3037
Viva de Cub.	-0.2932	2.6599
Granizo	-0.2932	2.6599
Viento Comp.	-0.3235	2.1391
Viento Succion	0.3235	-2.1391
Comb. 1	-0.2012	1.8252
Comb. 2	-0.3191	2.8944
Comb. 3	-0.3191	2.8944
Comb. 4	-0.8033	6.8899
Comb. 5	-0.8033	6.8899
Comb. 6	-0.8033	6.8899
Comb. 7	-0.8033	6.8899
Comb. 8	-0.6426	5.0335
Comb. 9	-0.6426	5.0335
Comb. 10	-0.6426	5.0335
Comb. 11	-0.6426	5.0335
Comb. 12	-0.4528	3.3124
Comb. 13	-0.4528	3.3124

APOYO 2		
Combinacion	Rx	Ry
Muerta	-0.1437	1.3037
Viva de Cub.	-0.2932	2.6599
Granizo	-0.2932	2.6599
Viento Comp.	-0.3235	2.1391
Viento Succion	0.3235	-2.1391
Comb. 1	-0.2012	1.8252
Comb. 2	-0.3191	2.8944
Comb. 3	-0.3191	2.8944
Comb. 4	-0.8033	6.8899
Comb. 5	-0.8033	6.8899
Comb. 6	-0.8033	6.8899
Comb. 7	-0.8033	6.8899
Comb. 8	-0.6426	5.0335
Comb. 9	-0.6426	5.0335
Comb. 10	-0.6426	5.0335
Comb. 11	-0.6426	5.0335
Comb. 12	-0.4528	3.3124
Comb. 13	-0.4528	3.3124

Memorias de Cálculo

PROGRAMA DE DISEÑO Y CALCULO ESTRUCTURAL ARQUIMET 2.0

Proyecto: _____ Fecha: _____

Ingeniero: _____ Firma: _____

FUERZAS INTERNAS - EJES LOCALES (KN-m)

Elementos calculados con el programa de diseño Arquimet 2.0 de ACESCO

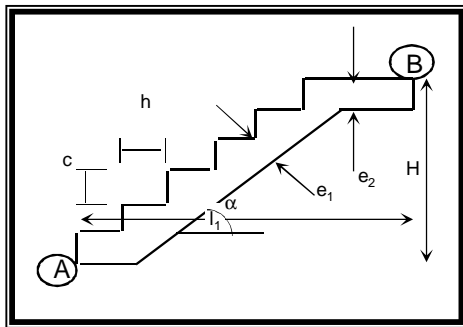
APOYO 1				
Combinacion	R2	R3	M2	M3
Muerta	0.0529	1.3105	2.3942E-09	1.3408E-07
Viva de Cub.	0.1078	2.6739	4.7884E-09	-1.8771E-06
Granizo	0.1078	2.6739	4.7884E-09	-1.8771E-06
Viento Comp.	0.0000	2.1634	0.0000	-8.2361E-07
Viento Succion	0.0000	2.1634	0.0000	-8.2361E-07
Comb. 1	0.0740	1.8347	3.3519E-09	1.8771E-07
Comb. 2	0.1173	2.9096	5.2672E-09	-7.7764E-07
Comb. 3	0.1173	2.9096	5.2672E-09	-7.7764E-07
Comb. 4	0.2360	6.9325	1.0534E-08	-3.2542E-06
Comb. 5	0.2360	6.9325	1.0534E-08	-3.2542E-06
Comb. 6	0.2360	6.9325	1.0534E-08	-3.2542E-06
Comb. 7	0.2360	6.9325	1.0534E-08	-3.2542E-06
Comb. 8	0.1173	5.0730	5.2672E-09	-1.6012E-06
Comb. 9	0.1173	5.0730	5.2672E-09	-1.6012E-06
Comb. 10	0.1173	5.0730	5.2672E-09	-1.6012E-06
Comb. 11	0.1173	5.0730	5.2672E-09	-1.6012E-06
Comb. 12	0.0476	3.3429	2.1548E-09	-7.0294E-07
Comb. 13	0.0476	3.3429	2.1548E-09	-7.0294E-07

APOYO 2				
Combinacion	R2	R3	M2	M3
Muerta	0.0529	1.3105	0.0000	0.0000
Viva de Cub.	0.1078	2.6739	-9.5768E-09	-2.7581E-06
Granizo	0.1078	2.6739	-9.5768E-09	-2.7581E-06
Viento Comp.	0.0000	2.1634	0.0000	9.1937E-07
Viento Succion	0.0000	2.1634	0.0000	9.1937E-07
Comb. 1	0.0740	1.8347	0.0000	0.0000
Comb. 2	0.1173	2.9095	-4.7884E-09	-1.3791E-06
Comb. 3	0.1173	2.9095	-4.7884E-09	-1.3791E-06
Comb. 4	0.2360	6.9325	-1.5323E-08	-3.9533E-06
Comb. 5	0.2360	6.9325	-1.5323E-08	-3.9533E-06
Comb. 6	0.2360	6.9325	-1.5323E-08	-3.9533E-06
Comb. 7	0.2360	6.9325	-1.5323E-08	-3.9533E-06
Comb. 8	0.1173	5.0730	-4.7884E-09	-4.5969E-07
Comb. 9	0.1173	5.0730	-4.7884E-09	-4.5969E-07
Comb. 10	0.1173	5.0730	-4.7884E-09	-4.5969E-07
Comb. 11	0.1173	5.0730	-4.7884E-09	-4.5969E-07
Comb. 12	0.0476	3.3429	0.0000	9.1937E-07
Comb. 13	0.0476	3.3429	0.0000	9.1937E-07

DISEÑO DE ESCALERA
PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO,
CLL 17 N°3N-103 IPIALES (NARIÑO)
ESCALERA TIPO

Diseño Tramos Inclinados

El diseño se realiza para el tramo inclinado de la escalera mas largo.



Geometría de la losa

$l_1 = 8.55$ m	$f_y = 420$ MPa
$H = 3.50$ m	$f'_c = 21.1$ MPa
$c = 17.5$ cm	$h = 28$ cm

Espesor escogido: **20** cm
Pendiente $\alpha = h/l_1$: 22.262 °

Cargas

Peso propio de la losa	$0.2 \times 100 \times 24 / \cos 22.26^\circ$	5.19	kN/m ²
Peso propio de peldaños	$1/2 \times (0.175 \times 0.28) / 0.28 \times 24$	2.10	kN/m ²
Acabado peldaños	$0.04 \times (0.18 + 0.28) / 0.28 \times 22$	1.43	kN/m ²
Afinado Inferior	$0.02 \times 22 / \cos 22.26^\circ$	0.48	kN/m ²
Sobrecarga		5.00	kN/m ²
		19.03	kN/m²

$CU = 19.03$ kN/m²

Diseño Tramo Inclinado

Momentos en tramo A-B.

$M = 173.90$ kN-m

$Cuantía:$ 0.0182
 As 36.46 cm²/m

$As_{mín} = 2.4$ cm²/m
Colocar 1#7 c/.10 longitudinalmente
Colocar 1#7 c/.10 transversalmente

PROYECTO:I.E.BARRIO OBRERO
DISEÑO MIEMBROS ENSAMBLADOS

MATERIALES

Acero **A-36**
 $f_y = 252 \text{ N/mm}^2$
 $F_u = 400 \text{ N/mm}^2$

CARGAS

$V = 4.66 \text{ KN}$

Pernos $\phi = 6.35 \text{ mm}$
Agujeros $\phi = 9.5 \text{ mm}$

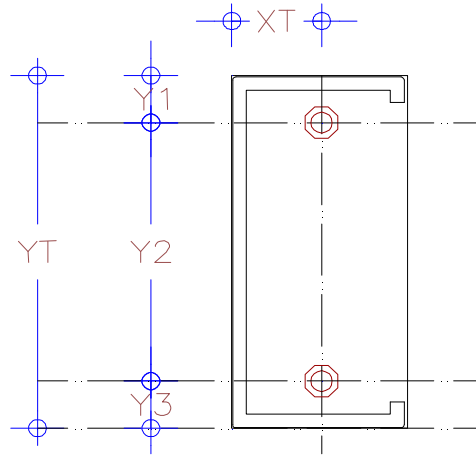
Espesor platina = **6.35 mm**

DATOS DEL ELEMENTO

$X1 = 35 \text{ mm}$
 $t = 35 \text{ mm}$
 $XT = 35 \text{ mm}$
 $Y1 = 35 \text{ mm}$
 $Y2 = 134 \text{ mm}$
 $Y3 = 35 \text{ mm}$
 $YT = 204 \text{ mm}$

$A_g = 1073.15 \text{ mm}^2$

$A_e = 922 \text{ mm}^2$



FLUENCIA EN LA SECCIÓN BRUTA

Se debe cumplir:

$$P_u < 0.90 F_y A_g$$

$P_u < 243 \text{ kN}$
OK

$A_{g \text{ Diseño}} = 21 \text{ mm}^2$
OK

FRACTURA EN LA SECCIÓN EFECTIVA

Se debe cumplir:

$$P_u < 0.75 F_u A_e$$

$P_u < 277 \text{ kN}$
OK

$A_{e \text{ Diseño}} = 16 \text{ mm}^2$
OK

Resistencia al desgarre de un bloque por tensión y cortante

$A_{nv} = 922 \text{ mm}^2$
 $A_{nt} = 193 \text{ mm}^2$
 $F_u A_{nt} = \text{KN}$
 $0.6 F_u A_{nv} = 221 \text{ KN}$

Para el analisis se supone riesgo de falla por bloque,
con base en dos estados limites definidos asi:

Si $F_u A_{nt} > 0.6 F_u A_{nv}$ entonces; $P_u = \Phi [0.6 F_y A_{gv} + F_u A_{nt}]$

Si $0.6 F_u A_{nv} > F_u A_{nt}$ entonces; $P_u = \Phi [0.6 F_u A_{nv} + F_y A_{gt}]$

Fractura de la sección neta a tensión y fluencia de la sección bruta a corte.

$A_{gv} = 1295.4 \text{ mm}^2$
 $A_{gt} = 222.25 \text{ mm}^2$

Por lo tanto,

$P_u = 205 \text{ kN}$

OK

PROYECTO: I.E. BARRIO OBRERO

CÁLCULO DE DEFLEXIONES

VIGA CON APOYOS CONTINUOS

Las deflexiones inmediatas se calcularán por las fórmulas de la teoría de la elasticidad considerando los efectos que tienen la fisuración y el refuerzo sobre la rigidez de la viga; las deflexiones adicionales deben determinarse multiplicando las deflexiones inmediatas causadas por la carga muerta por el factor λ de la NSR-10 Título C.9.5.2.5. En luces continuas el momento de inercia efectivo debe tomarse como el promedio de los valores del momento de inercia efectivo para la sección crítica del momento positivo y la sección crítica de momento negativo.

MOMENTO POSITIVO

$f'_c =$	21.1	MPa	$h =$	45	cm
$f_y =$	420	MPa	$d =$	40	cm
			$b =$	40	cm
$A_s =$	1342	mm ²			13.42 cm ²
$n =$	9.3				
$A_s' =$	1020	mm ²			10.20 cm ²

DETERMINACIÓN DE LA PROFUNDIDAD DEL EJE NEUTRO

$$\frac{bx^2}{2} + (2n-1)A_s'(x - d') = nA_s(d - x)$$

Donde:

n	Relación de módulos de elasticidad entre acero/concreto
b	Base de la sección
d	Altura efectiva de la sección
d'	Recubrimiento del refuerzo superior
x	Profundidad del eje neutro
A_s'	Área del acero a compresión (mm ²)
A_s	Área del acero a tracción (mm ²)

Luego:

n	9.3		
A_s'	1020	mm ²	$(2n-1)A_s' =$ 17878.23 mm ²
A_s	1342	mm ²	$nA_s =$ 12432.07 mm ²
d'	50	mm	5 cm

Profundidad del eje neutro:

$x =$	111.8	mm	11.18	cm
-------	-------	----	-------	----

PROYECTO: I.E. BARRIO OBRERO CÁLCULO DE DEFLEXIONES

MOMENTO DE INERCIA DE LA SECCION TRANSFORMADA FISURADA

$$\frac{bx^3}{3} + (2n-1)As'(x-d')^2 + nAs(d-x)^2$$

$$I_{cr} = 128720.04 \text{ cm}^4 \quad 0.00129 \text{ m}^4$$

MOMENTO DE INERCIA SECCIÓN TOTAL DE CONCRETO

$$I_g = 303750 \text{ cm}^4 \quad 0.00304 \text{ m}^4$$

$$Y_t = 33.82 \text{ cm}$$

$$M_{cr} = \frac{f_r I_g}{Y_t} \quad f_r = 0.7 \sqrt{f'_c}$$

$$M_{cr} = 28.88 \text{ kN-m}$$

Ma = Momento máximo presente en la viga

$$M_a = 208.0 \text{ kN-m}$$

$$I_e = \left\{ \frac{M_{cr}}{M_a} \right\}^3 * I_g + \left\{ 1 - \left\{ \frac{M_{cr}}{M_a} \right\}^3 \right\} * I_{cr}$$

$$I_e = 129188.4 \text{ cm}^4 \quad 12.919 \text{ OK}$$

PROYECTO: I.E. BARRIO OBRERO CÁLCULO DE DEFLEXIONES

MOMENTO NEGATIVO

f'c=	21.1	MPa	h=	45	cm
fy=	420	MPa	d=	40	cm
			b=	40	cm
	As=	1342	mm ²	13.42	cm ²
	n=	9.3			
	As'=	2040	mm ²	20.40	cm ²

DETERMINACIÓN DE LA PROFUNDIDAD DEL EJE NEUTRO

$$\frac{bx^2}{2} + (2n-1)As'(x - d') = nAs(d - x)$$

Donde:

n	Relación de módulos de elasticidad entre acero/concreto
b	Base de la sección
d	Altura efectiva de la sección
d'	Recubrimiento del refuerzo superior
x	Profundidad del eje neutro
As'	Área del acero a compresión (mm ²)
As	Área del acero a tracción (mm ²)

Luego:

n	9.3		
As'	2040	mm ²	(2n-1)A's = 35756.46 mm ²
As	1342	mm ²	nAs = 12432.07 mm ²
d'	50	mm	5 cm

Profundidad del eje neutro:

x=	99.0	mm	9.90	cm
----	------	----	------	----

MOMENTO DE INERCIA DE LA SECCION TRANSFORMADA FISURADA

$$\frac{bx^3}{3} + (2n-1)As'(x - d')^2 + nAs(d - x)^2$$

I cr=	134158.56	cm ⁴	0.00134	m ⁴
-------	-----------	-----------------	---------	----------------

PROYECTO: I.E. BARRIO OBRERO CÁLCULO DE DEFLEXIONES

MOMENTO DE INERCIA SECCIÓN TOTAL DE CONCRETO

$$I_g = 303750 \text{ cm}^4 \quad 0.00304 \text{ m}^4$$

$$Y_t = 35.10 \text{ cm}$$

$$M_{cr} = \frac{f_r I_g}{Y_t} \quad f_r = 0.7 \sqrt{f'_c}$$

$$M_{cr} = 27.82 \text{ kN-m}$$

Ma = Momento máximo presente en la viga

$$M_a = 227.4 \text{ kN-m}$$

$$I_e = \left\{ \frac{M_{cr}}{M_a} \right\}^3 * I_g + \left\{ 1 - \left\{ \frac{M_{cr}}{M_a} \right\}^3 \right\} * I_{cr}$$

$$I_e = 134469.4 \text{ cm}^4 \quad 13.447 \text{ OK}$$

Según el numeral C.9.5.2.3. la inercia efectiva es igual al promedio de las secciones críticas:

$$I_e = 131828.87 \text{ cm}^4 \quad 13.183 \text{ m}^4$$

DEFLEXIÓN ELÁSTICA INMEDIATA

$$\delta = \frac{5 w l^4}{384 E I_g}$$

Donde:

δ Deflexión elástica inmediata
w Carga por metro lineal
l Longitud de la viga
E Módulo de elasticidad del concreto
I_g Momento de la sección total

Luego:

$$w = 1.98 \text{ kN/m}$$

$$E = 21589 \text{ MPa}$$

$$\delta = 0.0007 \text{ m}$$

DEFLEXIÓN INMEDIATA POR :

CARGA MUERTA 80%	0.001 m	0.060 mm
CARGA VIVA 20%	0.000 m	0.013 mm

DEFLEXIÓN ADICIONAL LARGO PLAZO (5 AÑOS O MAS)

PROYECTO: I.E. BARRIO OBRERO CÁLCULO DE DEFLEXIONES

La deflexión adicional a largo plazo causada por la retracción de fraguado y el flujo plástico, se determinará multiplicando la deflexión causada por la carga muerta por el factor λ .

$$\lambda = \frac{\xi}{1 + 50 \rho'}$$

Donde:

ξ Coeficientes de efectos de largo plazo. Según NSR- 10 Título C.9.5.2.5
 ρ' Cuantía del refuerzo a compresión

Luego:

ξ 2.0
 ρ' 0.00680

$$\lambda = 1.493$$
$$\delta = 0.0008 \text{ m}$$

COMPARACION CON TABLA C.9-2 NSR 98
DEFLEXIONES MAXIMAS CALCULADAS PERMISIBLES

	L=	6.60 m	
DEFLEXION LIMITE	L/480	0.0138 m	
DEFLEXION LARGO PLAZO		0.0010 m	OK

7. DISEÑO DE ELEMENTOS NO ESTRUCTURALES

*DISEÑO DE ELEMENTOS NO
ESTRUCTURALES*

DISEÑO DE ELEMENTOS NO ESTRUCTURALES

Units: kN*m

STORY DATA

Story	Height	Elevation	SimilarTo
N+6.65	3.20	6.65	None
N+3.45	3.50	3.45	None
BASE	0.00	-0.05	None

CENTER MASS RIGIDITY

Story	Diaphragm	MassX	MassY	XCM	YCM	CumMassX	CumMassY
N+6.65	D1	88.6565	88.6565	16.468	6.786	88.6565	88.6565
N+3.45	D1	311.4816	311.4816	17.543	6.571	400.1381	400.1381

XCCM	YCCM	XCR	YCR
16.468	6.786	15.975	7.972
17.305	6.619	16.507	8.636

STORY SHEARS

Story	Load	Loc	P	VX	VY	T	MX	MY
N+6.65	SISDISX	Top	0.00	206.14	48.98	1325.53	0.00	0.00
N+6.65	SISDISX	Bottom	0.00	206.14	48.98	1325.53	156.73	659.66
N+6.65	SISDISY	Top	0.00	46.93	200.33	4167.33	0.00	0.00
N+6.65	SISDISY	Bottom	0.00	46.93	200.33	4167.33	641.07	150.19
N+3.45	SISDISX	Top	0.00	635.02	121.42	3422.40	156.73	659.66
N+3.45	SISDISX	Bottom	0.00	635.02	121.42	3422.40	533.15	2863.85
N+3.45	SISDISY	Top	0.00	117.71	652.69	13800.51	641.07	150.19
N+3.45	SISDISY	Bottom	0.00	117.71	652.69	13800.51	2914.39	530.38

$$F_p = \frac{a_x a_p}{R_p} g M_p \geq \frac{A_a I}{2} g M_p$$

g: 9.81 m/s^2
Sa: 0.898 s

$$a_x = \frac{C_{vx} V_s}{m_x g} \leq 2 S_a$$

$$C_{vx} = \frac{m_x h_x^k}{\sum_{i=1}^n (m_i h_i^k)}$$

$$V_s = S_a g M$$

Grupo de uso: III
Grado de desempeño: SUPERIOR

Grupo de Uso	Grado de desempeño
IV	SUPERIOR
III	SUPERIOR
II	BUENO
I	BAJO

Grado de desempeño de los elementos no estructurales: SUPERIOR

ANALISIS DE CARGAS PARA MUROS

Espesor de muros: 0.15 m
 Espesor de pañete en una cara: 0 m
 Densidad de mamposteria: 13 kN/m³
 Densidad mortero de pañete: 21 kN/m³
 Altura Fachada: 3.50 m
 Carga 6.825 kN/m
 Descripción: mamposteria reforzada, separada lateralmente de la estructura,
 apoyada arriba y abajo
 ap: 1.0
 Rp: 6

ANALISIS DE CARGAS PARA ANTEPECHOS

Espesor de muros: 0.15 m
 Espesor de pañete en una cara: 0 m
 Densidad de mamposteria: 13 kN/m³
 Densidad mortero de pañete: 21 kN/m³
 Altura Antepecho: 1 m
 Carga 1.95 kN/m
 Descripción: mamposteria reforzada, separada lateralmente de la estructura,
 apoyada solo abajo
 ap: 2.5
 Rp: 6

Sección de vigas verticales: 0.15x0.25 m
 f'c = 21.1 MPa
 fy = 420 MPa

DISEÑO PARA MUROS

Story	Fx	Wx	ax	ap	Rp	Fp	M	V
N+6.65	206.14	88.66	1.796	1.0	6	2.043	3.128	3.575
N+3.45	452.36	311.48	1.452	1.0	6	1.652	2.530	2.891

Sección Vigas V.				As. (cm ²)		Separación column.		Fl. 1/4"
Story	b	d	ρ	neces.	ubicado	S max	S escogida	S estribos
N+6.65	0.15	0.21	0.00114	0.36	0.71	1.97	2.00	0.188
N+3.45	0.15	0.21	0.00092	0.29	0.71	2.45	2.40	0.188

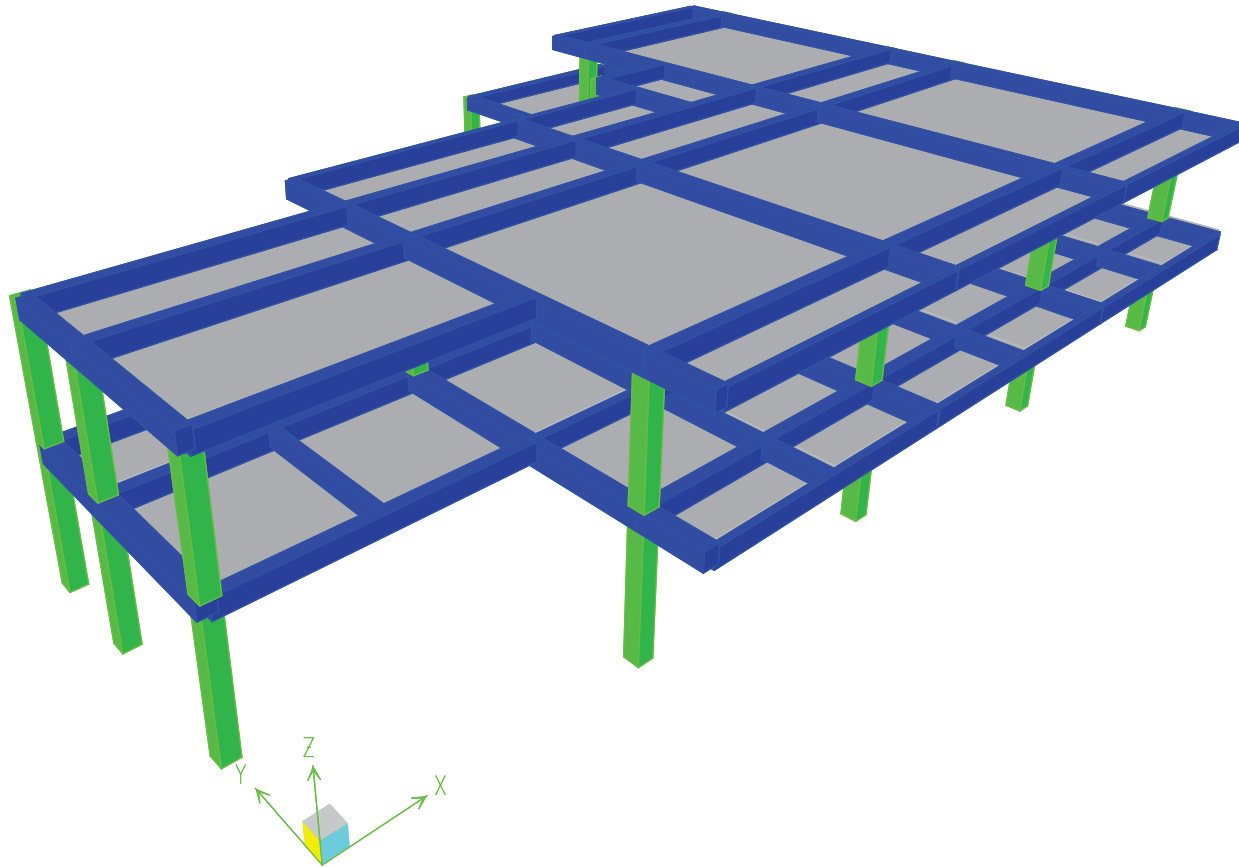
DISEÑO PARA ANTEPECHOS

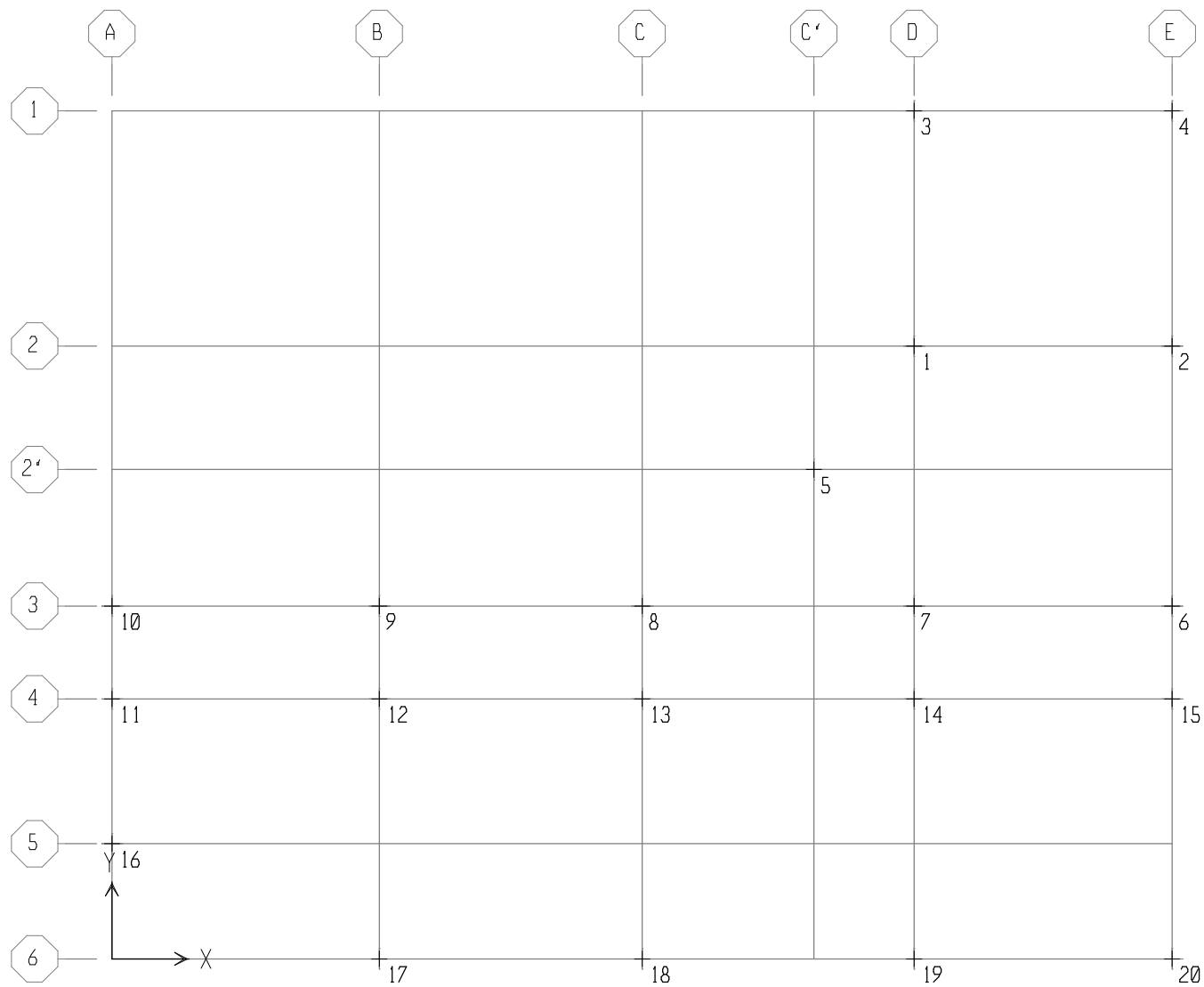
Story	Fx	Wx	ax	ap	Rp	Fp	M	V
N+6.65	206.14	88.66	1.796	2.5	6	5.107	7.821	8.938
N+3.45	452.36	311.48	1.452	2.5	6	4.130	6.324	7.227

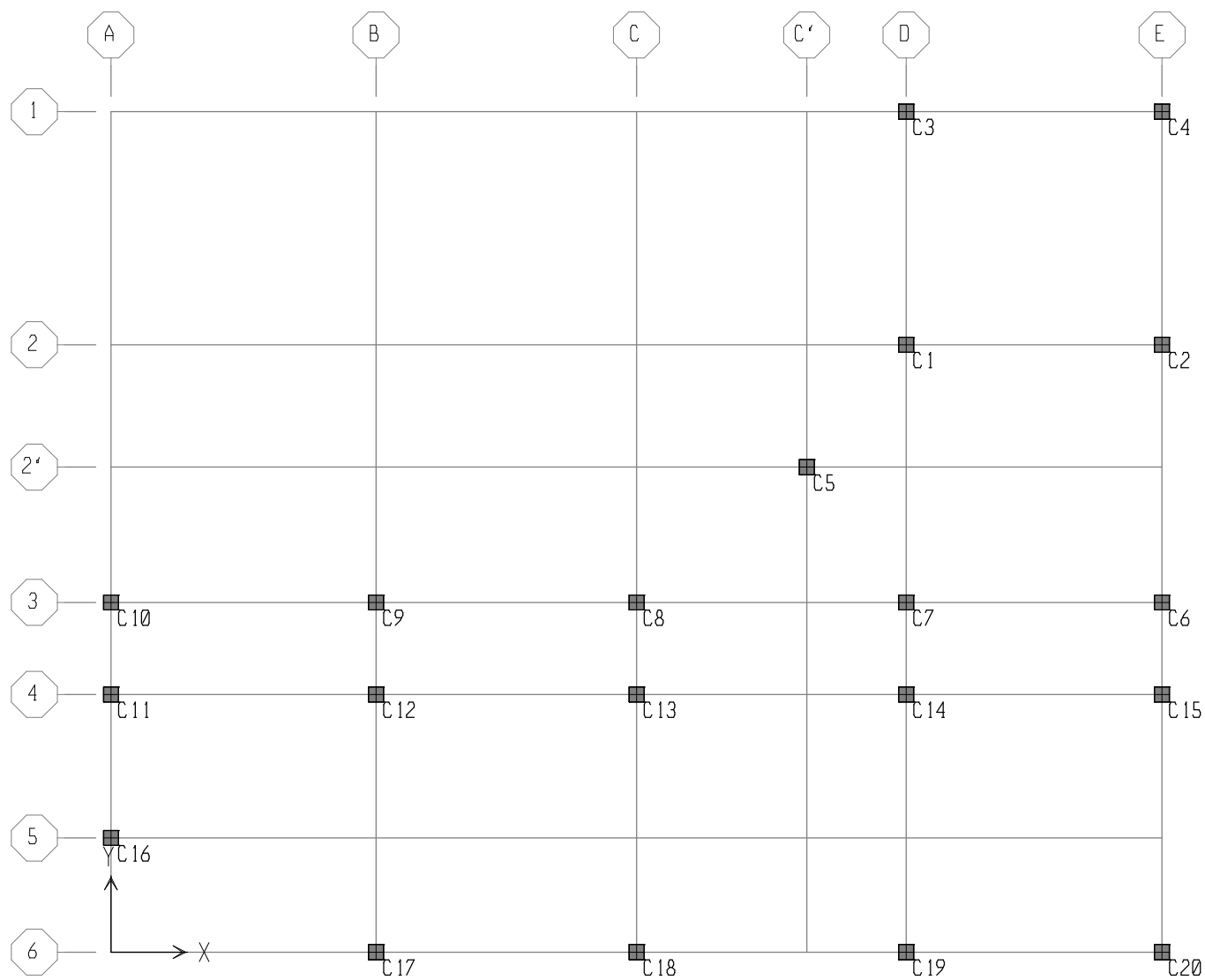
Sección columneta				As. (cm ²)		Separación column.		Fl. 1/4"
Story	b	d	ρ	neces.	ubicado	S max	S escogida	S estribos
N+6.65	0.15	0.21	0.00291	0.92	1.29	1.41	1.40	0.188
N+3.45	0.15	0.21	0.00234	0.74	1.29	1.75	1.70	0.188

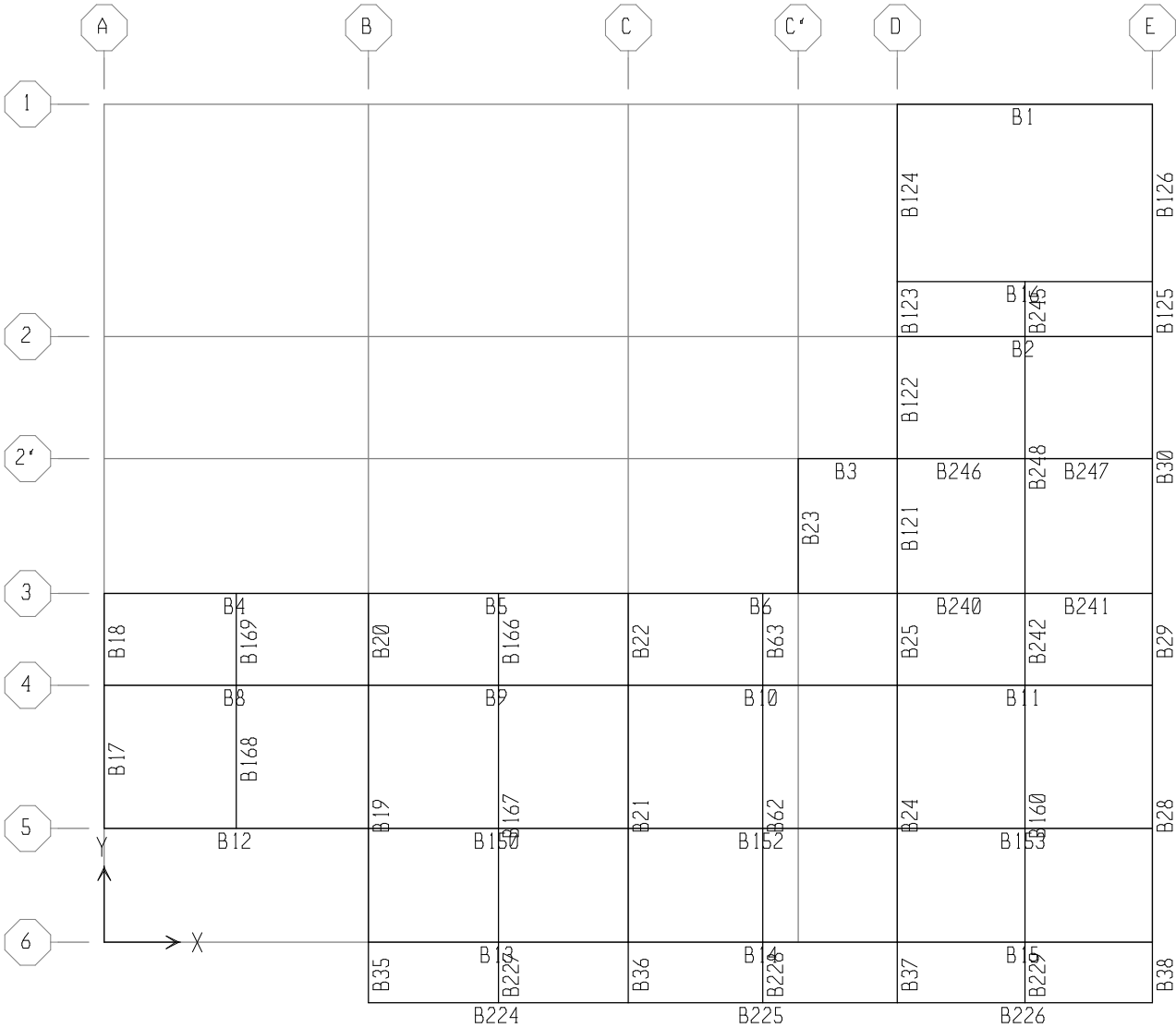
8. ANEXOS DE COMPUTADOR

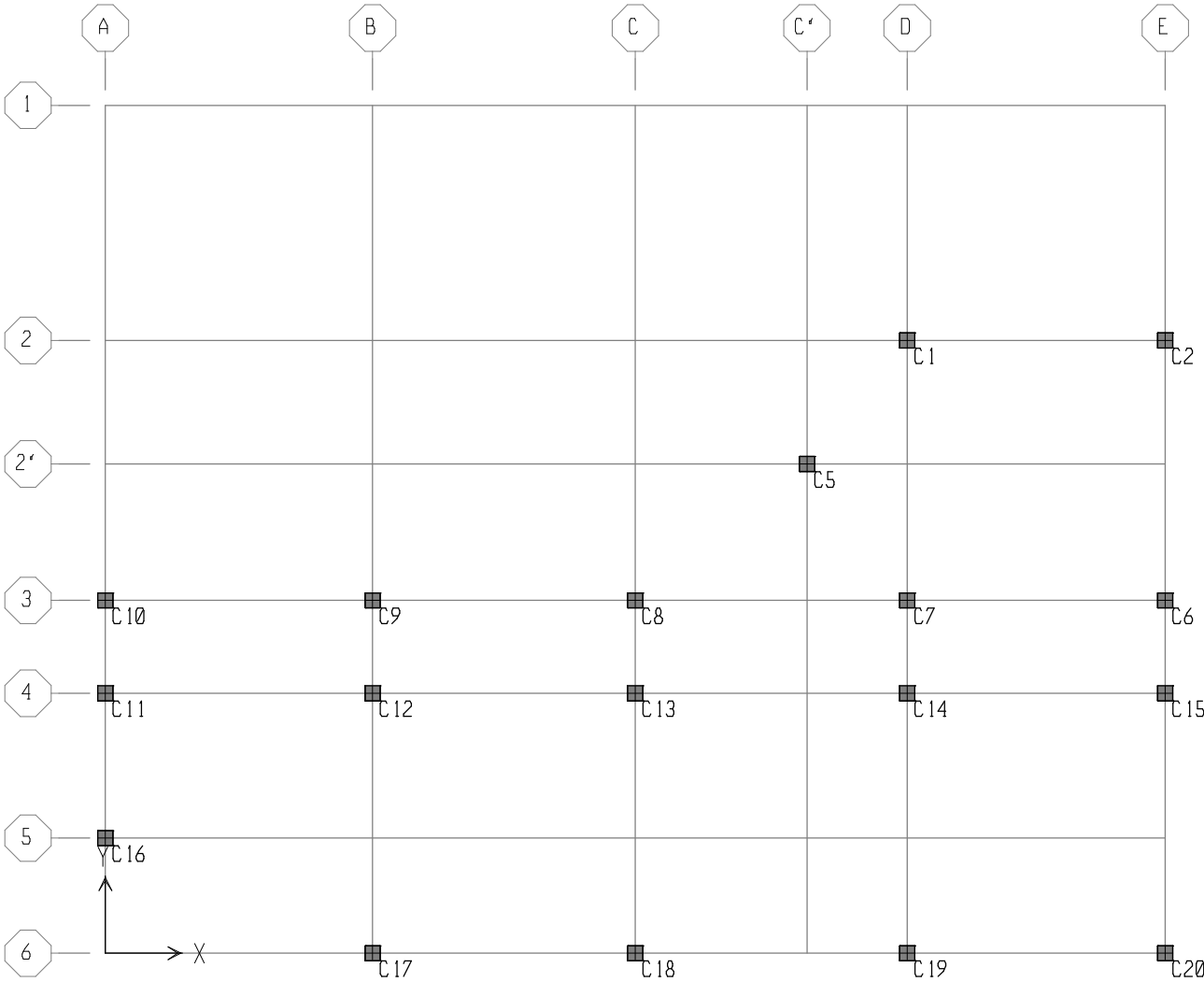
ANEXOS DE COMPUTADOR

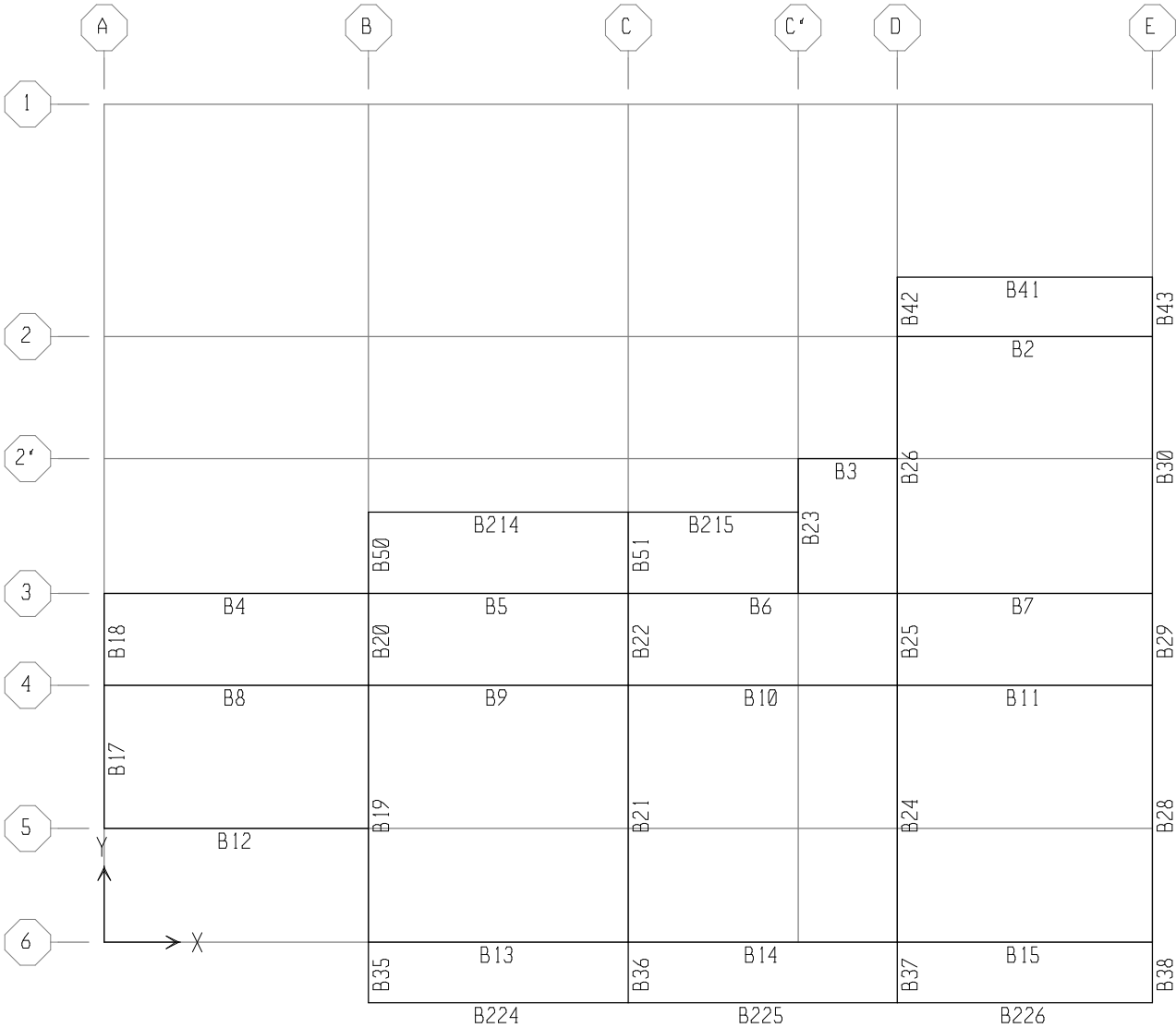














ETABS v9.7.4 File:BARRIO OBRERO Units:KN-m octubre 4, 2016 9:41 PAGE 1

S T O R Y D A T A

STORY	SIMILAR TO	HEIGHT	ELEVATION
N+6.65	None	3.200	6.650
N+3.45	None	3.500	3.450
BASE	None		-0.050

ETABS v9.7.4 File:BARRIO OBRERO Units:KN-m octubre 4, 2016 9:41 PAGE 2

P O I N T C O O R D I N A T E S

POINT	X	Y	DZ-BELOW
1	21.600	16.500	0.000
2	28.550	16.500	0.000
3	21.600	22.830	0.000
4	28.550	22.830	0.000
5	18.900	13.174	0.000
6	28.550	9.500	0.000
7	21.600	9.500	0.000
8	14.275	9.500	0.000
9	7.200	9.500	0.000
10	0.000	9.500	0.000
11	0.000	7.000	0.000
12	7.200	7.000	0.000
13	14.275	7.000	0.000
14	21.600	7.000	0.000
15	28.550	7.000	0.000
16	0.000	3.100	0.000
17	7.200	0.000	0.000
18	14.275	0.000	0.000
19	21.600	0.000	0.000
20	28.550	0.000	0.000
21	21.600	13.174	0.000
22	7.200	3.100	0.000
23	21.600	18.000	0.000
24	28.550	18.000	0.000
25	18.900	9.500	0.000
26	7.200	-1.650	0.000
27	14.275	-1.650	0.000
28	21.600	-1.650	0.000
29	28.550	-1.650	0.000
35	21.600	18.120	0.000
36	28.550	18.120	0.000
37	7.200	11.720	0.000
38	14.275	11.720	0.000
40	18.900	11.720	0.000
103	10.738	0.000	0.000
105	10.738	9.500	0.000
107	17.938	0.000	0.000
108	17.938	7.000	0.000
109	17.938	9.500	0.000
111	3.600	3.100	0.000
113	3.600	9.500	0.000
114	25.075	0.000	0.000
133	28.550	3.100	0.000
135	14.275	3.100	0.000
138	21.600	3.100	0.000
140	25.075	7.000	0.000
141	25.075	9.500	0.000
143	25.075	16.500	0.000
144	10.738	7.000	0.000
145	3.600	7.000	0.000
165	28.550	13.174	0.000
167	10.738	3.100	0.000
168	17.938	3.100	0.000
171	25.075	3.100	0.000
172	25.075	13.174	0.000
211	10.738	-1.650	0.000
212	17.938	-1.650	0.000
213	25.075	-1.650	0.000
318	25.075	18.000	0.000

ETABS v9.7.4 File:BARRIO OBRERO Units:KN-m octubre 4, 2016 9:41 PAGE 3



C O L U M N C O N N E C T I V I T Y D A T A

COLUMN	I END PT	J END PT	I END STORY
C1	1	1	Below
C2	2	2	Below
C3	3	3	Below
C4	4	4	Below
C5	5	5	Below
C6	6	6	Below
C7	7	7	Below
C8	8	8	Below
C9	9	9	Below
C10	10	10	Below
C11	11	11	Below
C12	12	12	Below
C13	13	13	Below
C14	14	14	Below
C15	15	15	Below
C16	16	16	Below
C17	17	17	Below
C18	18	18	Below
C19	19	19	Below
C20	20	20	Below

ETABS v9.7.4 File:BARRIO OBRERO Units:KN-m octubre 4, 2016 9:41 PAGE 4

B E A M C O N N E C T I V I T Y D A T A

BEAM	I END PT	J END PT
B1	3	4
B2	1	2
B3	5	21
B4	10	9
B5	9	8
B6	8	7
B7	7	6
B8	11	12
B9	12	13
B10	13	14
B11	14	15
B12	16	22
B13	17	18
B14	18	19
B15	19	20
B16	23	24
B17	16	11
B18	11	10
B19	17	12
B20	12	9
B21	18	13
B22	13	8
B23	25	5
B24	19	14
B25	14	7
B26	7	1
B28	20	15
B29	15	6
B30	6	2
B35	26	17
B36	27	18
B37	28	19
B38	29	20
B41	35	36
B42	1	35
B43	2	36
B50	9	37
B51	8	38
B62	107	108
B63	108	109
B121	7	21
B122	21	1
B123	1	23
B124	23	3
B125	2	24
B126	24	4



B150	22	135
B152	135	138
B153	138	133
B160	114	140
B166	144	105
B167	103	144
B168	111	145
B169	145	113
B214	37	38
B215	38	40
B224	26	27
B225	27	28
B226	28	29
B227	211	103
B228	212	107
B229	213	114
B240	7	141
B241	141	6
B242	140	141
B245	143	318
B246	21	172
B247	172	165
B248	141	143

ETABS v9.7.4 File:BARRIO OBRERO Units:KN-m octubre 4, 2016 9:41 PAGE 5

R I G I D D I A P H R A G M P O I N T C O N N E C T I V I T Y D A T A

STORY	DIAPHRAGM	POINT	POINT	POINT	POINT	POINT
N+6.65	D1	1	2	5	6	7
		8	9	10	11	12
		13	14	15	16	17
		18	19	20	21	22
		25	35	36	37	38
		40	26	27	28	29
N+3.45	D1	1	2	3	4	5
		6	7	8	9	10
		11	12	13	14	15
		16	17	18	19	20
		21	22	23	24	25
		26	27	28	29	111
		113	103	105	107	109
		114	133	135	138	140
		141	143	108	144	145
		165	167	168	171	172
		211	212	213		

ETABS v9.7.4 File:BARRIO OBRERO Units:KN-m octubre 4, 2016 9:41 PAGE 6

M A T E R I A L P R O P E R T Y D A T A

MATERIAL NAME	MATERIAL TYPE	DESIGN TYPE	MATERIAL DIR/PLANE	MODULUS OF ELASTICITY	POISSON'S RATIO	THERMAL COEFF	SHEAR MODULUS
STEEL	Iso	Steel	All	199947978.80	0.3000	1.1700E-05	76903068.77
CONC21	Iso	Concrete	All	21538105.766	0.2000	9.9000E-06	8974210.736

M A T E R I A L P R O P E R T Y M A S S A N D W E I G H T

MATERIAL NAME	MASS PER UNIT VOL	WEIGHT PER UNIT VOL
STEEL	7.8271E+00	7.6820E+01
CONC21	2.4000E+00	2.4000E+01

M A T E R I A L D E S I G N D A T A F O R S T E E L M A T E R I A L S

MATERIAL NAME	STEEL FY	STEEL FU	STEEL COST (\$)
STEEL	344737.894	448159.263	271447.16



M A T E R I A L D E S I G N D A T A F O R C O N C R E T E M A T E R I A L S

MATERIAL NAME	LIGHTWEIGHT CONCRETE	CONCRETE FC	REBAR FY	REBAR FYS	LIGHTWT REDUC FACT
CONC21	No	21000.000	420000.000	420000.000	N/A

ETABS v9.7.4 File:BARRIO OBRERO Units:KN-m octubre 4, 2016 9:41 PAGE 7

F R A M E S E C T I O N P R O P E R T Y D A T A

FRAME SECTION NAME	MATERIAL NAME	SECTION SHAPE NAME OR NAME IN SECTION DATABASE FILE	CONC COL	CONC BEAM
COL40X40	CONC21	Rectangular	Yes	
VIG30X45	CONC21	Rectangular		Yes
VIG40X45	CONC21	Rectangular		Yes
VIG15X45	CONC21	Rectangular		Yes
VIG20X45	CONC21	Rectangular		Yes

F R A M E S E C T I O N P R O P E R T Y D A T A

FRAME SECTION NAME	SECTION DEPTH	FLANGE WIDTH TOP	FLANGE THICK TOP	WEB THICK	FLANGE WIDTH BOT	FLANGE THICK BOT
COL40X40	0.4000	0.4000	0.0000	0.0000	0.0000	0.0000
VIG30X45	0.4500	0.3000	0.0000	0.0000	0.0000	0.0000
VIG40X45	0.4500	0.4000	0.0000	0.0000	0.0000	0.0000
VIG15X45	0.4500	0.1500	0.0000	0.0000	0.0000	0.0000
VIG20X45	0.4500	0.2000	0.0000	0.0000	0.0000	0.0000

F R A M E S E C T I O N P R O P E R T Y D A T A

FRAME SECTION NAME	SECTION AREA	TORSIONAL CONSTANT	MOMENTS OF INERTIA I33	MOMENTS OF INERTIA I22	SHEAR AREAS A2	SHEAR AREAS A3
COL40X40	0.1600	0.0036	0.0021	0.0021	0.1333	0.1333
VIG30X45	0.1350	0.0024	0.0023	0.0010	0.1125	0.1125
VIG40X45	0.1800	0.0045	0.0030	0.0024	0.1500	0.1500
VIG15X45	0.0675	0.0004	0.0011	0.0001	0.0563	0.0563
VIG20X45	0.0900	0.0009	0.0015	0.0003	0.0750	0.0750

F R A M E S E C T I O N P R O P E R T Y D A T A

FRAME SECTION NAME	SECTION MODULI S33	SECTION MODULI S22	PLASTIC MODULI Z33	PLASTIC MODULI Z22	RADIUS OF GYRATION R33	RADIUS OF GYRATION R22
COL40X40	0.0107	0.0107	0.0160	0.0160	0.1155	0.1155
VIG30X45	0.0101	0.0068	0.0152	0.0101	0.1299	0.0866
VIG40X45	0.0135	0.0120	0.0203	0.0180	0.1299	0.1155
VIG15X45	0.0051	0.0017	0.0076	0.0025	0.1299	0.0433
VIG20X45	0.0068	0.0030	0.0101	0.0045	0.1299	0.0577

F R A M E S E C T I O N W E I G H T S A N D M A S S E S

FRAME SECTION NAME	TOTAL WEIGHT	TOTAL MASS
COL40X40	489.9840	48.9984
VIG30X45	932.4850	93.2485
VIG40X45	358.4909	35.8491
VIG15X45	99.3870	9.9387
VIG20X45	204.3090	20.4309

C O N C R E T E C O L U M N D A T A

FRAME SECTION NAME	REINF CONFIGURATION LONGIT LATERAL	REINF SIZE/TYPE	NUM BARS 3DIR/2DIR	NUM BARS CIRCULAR	BAR COVER
COL40X40	Rectangular Ties	#9/Design	4/4	N/A	0.0500



C O N C R E T E B E A M D A T A

FRAME SECTION NAME	TOP COVER	BOT COVER	TOP LEFT AREA	TOP RIGHT AREA	BOT LEFT AREA	BOT RIGHT AREA
VIG30X45	0.0500	0.0500	0.000	0.000	0.000	0.000
VIG40X45	0.0500	0.0500	0.000	0.000	0.000	0.000
VIG15X45	0.0500	0.0500	0.000	0.000	0.000	0.000
VIG20X45	0.0500	0.0500	0.000	0.000	0.000	0.000

ETABS v9.7.4 File:BARRIO OBRERO Units:KN-m octubre 4, 2016 9:41 PAGE 8

S H E L L S E C T I O N P R O P E R T Y D A T A

SHELL SECTION	MATERIAL NAME	SHELL TYPE	LOAD DIST ONE WAY	MEMBRANE THICK	BENDING THICK	TOTAL WEIGHT	TOTAL MASS
SALONES	CONC21	Membrane	No	0.2540	0.2540	1717.5620	171.7562
CORREDORES	CONC21	Membrane	No	0.1420	0.1420	243.2460	24.3246
CUBLIV	CONC21	Membrane	Yes	0.0170	0.0170	168.7096	16.8710

ETABS v9.7.4 File:BARRIO OBRERO Units:KN-m octubre 4, 2016 9:41 PAGE 9

S T A T I C L O A D C A S E S

STATIC CASE	CASE TYPE	AUTO LAT LOAD	SELF WT MULTIPLIER	NOTIONAL FACTOR	NOTIONAL DIRECTION
DEAD	DEAD	N/A	1.0000		
LIVE	LIVE	N/A	0.0000		

ETABS v9.7.4 File:BARRIO OBRERO Units:KN-m octubre 4, 2016 9:41 PAGE 10

R E S P O N S E S P E C T R U M C A S E S

RESP SPEC CASE: SISDISX

BASIC RESPONSE SPECTRUM DATA

MODAL COMBO	DIRECTION COMBO	MODAL DAMPING	SPECTRUM ANGLE	TYPICAL ECCEN
SRSS	SRSS	0.0500	0.0000	0.0500

RESPONSE SPECTRUM FUNCTION ASSIGNMENT DATA

DIRECTION	FUNCTION	SCALE FACT
U1	DIENNO	10.1190
U2	----	N/A
UZ	----	N/A

RESP SPEC CASE: SISDISY

BASIC RESPONSE SPECTRUM DATA

MODAL COMBO	DIRECTION COMBO	MODAL DAMPING	SPECTRUM ANGLE	TYPICAL ECCEN
SRSS	SRSS	0.0500	0.0000	0.0500

RESPONSE SPECTRUM FUNCTION ASSIGNMENT DATA

DIRECTION	FUNCTION	SCALE FACT
U1	----	N/A
U2	DIENNO	9.8100
UZ	----	N/A

RESP SPEC CASE: SISDERX

BASIC RESPONSE SPECTRUM DATA



MODAL COMBO	DIRECTION COMBO	MODAL DAMPING	SPECTRUM ANGLE	TYPICAL ECCEN
SRSS	SRSS	0.0500	0.0000	0.0500

RESPONSE SPECTRUM FUNCTION ASSIGNMENT DATA

DIRECTION	FUNCTION	SCALE FACT
U1	DERIVAS	10.1190
U2	----	N/A
UZ	----	N/A

RESP SPEC CASE: SISDERY

BASIC RESPONSE SPECTRUM DATA

MODAL COMBO	DIRECTION COMBO	MODAL DAMPING	SPECTRUM ANGLE	TYPICAL ECCEN
SRSS	SRSS	0.0500	0.0000	0.0500

RESPONSE SPECTRUM FUNCTION ASSIGNMENT DATA

DIRECTION	FUNCTION	SCALE FACT
U1	----	N/A
U2	DERIVAS	9.8100
UZ	----	N/A

RESP SPEC CASE: SISUMBX

BASIC RESPONSE SPECTRUM DATA

MODAL COMBO	DIRECTION COMBO	MODAL DAMPING	SPECTRUM ANGLE	TYPICAL ECCEN
SRSS	SRSS	0.0200	0.0000	0.0500

RESPONSE SPECTRUM FUNCTION ASSIGNMENT DATA

DIRECTION	FUNCTION	SCALE FACT
U1	UMBRAL	11.2510
U2	----	N/A
UZ	----	N/A

RESP SPEC CASE: SISUMBY

BASIC RESPONSE SPECTRUM DATA

MODAL COMBO	DIRECTION COMBO	MODAL DAMPING	SPECTRUM ANGLE	TYPICAL ECCEN
SRSS	SRSS	0.0200	0.0000	0.0500

RESPONSE SPECTRUM FUNCTION ASSIGNMENT DATA

DIRECTION	FUNCTION	SCALE FACT
U1	----	N/A
U2	UMBRAL	10.5980
UZ	----	N/A

ETABS v9.7.4 File:BARRIO OBRERO Units:KN-m octubre 4, 2016 9:41 PAGE 11

LOADING COMBINATIONS

COMBO	COMBO TYPE	CASE	CASE TYPE	SCALE FACTOR
-------	---------------	------	--------------	-----------------



COMDER1	ADD	SISDERX	Spectra	1.0000
		SISDERY	Spectra	0.3000
COMDER2	ADD	SISDERX	Spectra	0.3000
		SISDERY	Spectra	1.0000
COMDIS1	ADD	DEAD	Static	1.4000
COMDIS2	ADD	DEAD	Static	1.2000
		LIVE	Static	1.6000
COMDIS3	ADD	DEAD	Static	1.2000
		LIVE	Static	1.0000
		SISDISX	Spectra	1.0000
		SISDISY	Spectra	0.3000
COMDIS4	ADD	DEAD	Static	1.2000
		LIVE	Static	1.0000
		SISDISX	Spectra	0.3000
		SISDISY	Spectra	1.0000
COMDIS5	ADD	DEAD	Static	0.9000
		SISDISX	Spectra	1.0000
		SISDISY	Spectra	0.3000
COMDIS6	ADD	DEAD	Static	0.9000
		SISDISX	Spectra	0.3000
		SISDISY	Spectra	1.0000
ENVOLVENTE	ENVE	COMDIS1	Combo	1.0000
		COMDIS2	Combo	1.0000
		COMDIS3	Combo	1.0000
		COMDIS4	Combo	1.0000
		COMDIS5	Combo	1.0000
		COMDIS6	Combo	1.0000
COMDERUMB	ADD	SISUMBX	Spectra	1.0000
		SISUMBY	Spectra	0.3000
COMDERUMB2	ADD	SISUMBX	Spectra	0.3000
		SISUMBY	Spectra	1.0000
CIMEN	ADD	DEAD	Static	1.0000
		LIVE	Static	1.0000
CIMEN2	ADD	DEAD	Static	1.0000
		LIVE	Static	0.7500
		SISDISX	Spectra	0.5250
		SISDISY	Spectra	0.1575
CIMEN3	ADD	DEAD	Static	1.0000
		LIVE	Static	0.7500
		SISDISX	Spectra	0.1575
		SISDISY	Spectra	0.5250
SISDISX2	ADD	SISDISX	Spectra	-1.0000
SISDISY2	ADD	SISDISY	Spectra	-1.0000
COMDIS3X3	ADD	DEAD	Static	1.2000
		LIVE	Static	1.0000
		SISDISX	Spectra	3.0000
		SISDISY	Spectra	0.9000
COMDIS4X3	ADD	DEAD	Static	1.2000
		LIVE	Static	1.0000
		SISDISX	Spectra	0.9000
		SISDISY	Spectra	3.0000
COMDIS5X3	ADD	DEAD	Static	0.9000
		SISDISX	Spectra	3.0000
		SISDISY	Spectra	0.9000
COMDIS6X3	ADD	DEAD	Static	0.9000
		SISDISX	Spectra	0.9000
		SISDISY	Spectra	3.0000
ENVE2	ENVE	COMDIS1	Combo	1.0000
		COMDIS2	Combo	1.0000
		COMDIS3X3	Combo	1.0000
		COMDIS4X3	Combo	1.0000
		COMDIS5X3	Combo	1.0000
		COMDIS6X3	Combo	1.0000

ETABS v9.7.4 File:BARRIO OBRERO Units:KN-m octubre 4, 2016 9:41 PAGE 12

R E S P O N S E S P E C T R U M F U N C T I O N - F R O M F I L E

FUNCTION NAME: DERIVAS

FILE NAME: c:\users\user\desktop\juan camilo\proyectos\2253 - dye16 - i.e. barrio obrero\modelo\derivadas.txt

DATA TYPE: Period vs Acceleration

NUMBER OF HEADER LINES = 0

PERIOD	ACCEL
0.0000	1.1250



PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO CLL 17 N° 3N-102
IPIALES (NARIÑO)
DATOS DE ENTRADA DEL MODELO ESTRUCTURAL

0.0300	1.1250
0.0700	1.1250
0.1000	1.1250
0.1300	1.1250
0.2600	1.1250
0.3800	1.1250
0.5100	1.1250
0.6300	1.1250
0.8500	0.8370
1.0700	0.6660
1.2900	0.5530
1.5100	0.4730
1.7200	0.4130
1.9400	0.3670
2.1600	0.3300
2.3800	0.3000
2.6000	0.2740
2.8100	0.2530
3.0300	0.2350
3.2500	0.2190
3.4700	0.2050
3.6900	0.1930
3.9100	0.1820
4.1200	0.1730
4.3400	0.1640
4.5600	0.1560
5.5600	0.1050
6.5600	0.0750

FUNCTION NAME: DISEÑO

FILE NAME: c:\users\user\desktop\juan camilo\proyectos\2253 - dye16 - i.e. barrio obrero\modelo\diseño.txt
DATA TYPE: Period vs Acceleration
NUMBER OF HEADER LINES = 0

PERIOD	ACCEL
0.0000	0.1790
0.0300	0.1790
0.0700	0.1790
0.1000	0.1790
0.1300	0.1790
0.2600	0.1790
0.3800	0.1790
0.5100	0.1790
0.6300	0.1790
0.8500	0.1330
1.0700	0.1060
1.2900	0.0880
1.5100	0.0750
1.7200	0.0660
1.9400	0.0580
2.1600	0.0520
2.3800	0.0480
2.6000	0.0440
2.8100	0.0400
3.0300	0.0370
3.2500	0.0350
3.4700	0.0330
3.6900	0.0310
3.9100	0.0290
4.1200	0.0270
4.3400	0.0260
4.5600	0.0250
5.5600	0.0170
6.5600	0.0120

FUNCTION NAME: UMBRAL

FILE NAME: c:\users\user\desktop\juan camilo\proyectos\2253 - dye16 - i.e. barrio obrero\modelo\umbral.txt
DATA TYPE: Period vs Acceleration
NUMBER OF HEADER LINES = 0

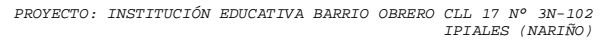
PERIOD	ACCEL
--------	-------

0.0000	0.0800
0.0500	0.1120
0.1000	0.1440
0.1500	0.1760
0.2000	0.2080
0.2500	0.2400
0.4100	0.2400
0.5600	0.2400
0.7200	0.2400
0.8800	0.2400
1.0300	0.2400
1.1900	0.2400
1.3400	0.2400
1.5000	0.2400
2.1400	0.1680
2.7900	0.1290
3.4300	0.1050
4.0700	0.0880
4.7100	0.0760
5.3600	0.0670
6.0000	0.0600
6.6400	0.0540
7.2900	0.0490
7.9300	0.0450
8.5700	0.0420
9.2100	0.0390
9.8600	0.0370
10.5000	0.0240
11.5000	0.0200
12.5000	0.0170

ETABS v9.7.4 File:BARRIO OBRERO Units:KN-m octubre 4, 2016 9:41 PAGE 13

FRAME SECTION ASSIGNMENTS TO LINE OBJECTS

STORY LEVEL	LINE ID	LINE TYPE	SECTION TYPE	AUTO SELECT SECTION	ANALYSIS SECTION	DESIGN PROCEDURE	DESIGN SECTION
N+6.65	C1	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	C2	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	C5	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	C6	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	C7	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	C8	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	C9	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	C10	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	C11	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	C12	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	C13	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	C14	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	C15	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	C16	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	C17	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	C18	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	C19	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	C20	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C1	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C2	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C3	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C4	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C5	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C6	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C7	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C8	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C9	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C10	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C11	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C12	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C13	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C14	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C15	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C16	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C17	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C18	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C19	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+3.45	C20	Column	Rectangular	None	COL40X40	Conc Frame	COL40X40
N+6.65	B2	Beam	Rectangular	None	VIG30X45	Conc Frame	VIG30X45

[illegible]



N+3.45	B126	Beam	Rectangular	None	VIG40X45	Conc	Frame	VIG40X45
N+3.45	B150	Beam	Rectangular	None	VIG20X45	Conc	Frame	VIG20X45
N+3.45	B152	Beam	Rectangular	None	VIG20X45	Conc	Frame	VIG20X45
N+3.45	B153	Beam	Rectangular	None	VIG20X45	Conc	Frame	VIG20X45
N+3.45	B160	Beam	Rectangular	None	VIG20X45	Conc	Frame	VIG20X45
N+3.45	B166	Beam	Rectangular	None	VIG20X45	Conc	Frame	VIG20X45
N+3.45	B167	Beam	Rectangular	None	VIG20X45	Conc	Frame	VIG20X45
N+3.45	B168	Beam	Rectangular	None	VIG20X45	Conc	Frame	VIG20X45
N+3.45	B169	Beam	Rectangular	None	VIG20X45	Conc	Frame	VIG20X45
N+3.45	B224	Beam	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+3.45	B225	Beam	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+3.45	B226	Beam	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+3.45	B227	Beam	Rectangular	None	VIG20X45	Conc	Frame	VIG20X45
N+3.45	B228	Beam	Rectangular	None	VIG20X45	Conc	Frame	VIG20X45
N+3.45	B229	Beam	Rectangular	None	VIG20X45	Conc	Frame	VIG20X45
N+3.45	B240	Beam	Rectangular	None	VIG30X45	Conc	Frame	VIG30X45
N+3.45	B241	Beam	Rectangular	None	VIG30X45	Conc	Frame	VIG30X45
N+3.45	B242	Beam	Rectangular	None	VIG20X45	Conc	Frame	VIG20X45
N+3.45	B245	Beam	Rectangular	None	VIG20X45	Conc	Frame	VIG20X45
N+3.45	B246	Beam	Rectangular	None	VIG30X45	Conc	Frame	VIG30X45
N+3.45	B247	Beam	Rectangular	None	VIG30X45	Conc	Frame	VIG30X45
N+3.45	B248	Beam	Rectangular	None	VIG20X45	Conc	Frame	VIG20X45

ETABS v9.7.4 File:BARRIO OBRERO Units:KN-m octubre 4, 2016 9:41 PAGE 14

D I S T R I B U T E D L O A D A S S I G N M E N T S T O L I N E O B J E C T S

LOAD CASE	STORY LEVEL	LINE ID	LOAD TYPE	LOAD DIRECTION	ABSOLUTE DISTANCE A	ABSOLUTE DISTANCE B	LOAD A PER LENGTH	LOAD B PER LENGTH
DEAD	N+6.65	B17	Force	Gravity	0.000	3.900	0.940	0.940
DEAD	N+6.65	B18	Force	Gravity	0.000	2.500	0.940	0.940
DEAD	N+6.65	B19	Force	Gravity	0.000	7.000	0.940	0.940
DEAD	N+6.65	B20	Force	Gravity	0.000	2.500	0.940	0.940
DEAD	N+6.65	B21	Force	Gravity	0.000	7.000	0.940	0.940
DEAD	N+6.65	B22	Force	Gravity	0.000	2.500	0.940	0.940
DEAD	N+6.65	B23	Force	Gravity	0.000	3.674	0.940	0.940
DEAD	N+6.65	B24	Force	Gravity	0.000	7.000	0.940	0.940
DEAD	N+6.65	B25	Force	Gravity	0.000	2.500	0.940	0.940
DEAD	N+6.65	B26	Force	Gravity	0.000	7.000	0.940	0.940
DEAD	N+6.65	B28	Force	Gravity	0.000	7.000	0.940	0.940
DEAD	N+6.65	B29	Force	Gravity	0.000	2.500	0.940	0.940
DEAD	N+6.65	B30	Force	Gravity	0.000	7.000	0.940	0.940
DEAD	N+6.65	B42	Force	Gravity	0.000	1.620	0.940	0.940
DEAD	N+6.65	B43	Force	Gravity	0.000	1.620	0.940	0.940
DEAD	N+6.65	B50	Force	Gravity	0.000	2.220	0.940	0.940
DEAD	N+6.65	B51	Force	Gravity	0.000	2.220	0.940	0.940
DEAD	N+3.45	B2	Force	Gravity	0.000	6.950	5.360	5.360
DEAD	N+3.45	B3	Force	Gravity	0.000	2.700	5.360	5.360
DEAD	N+3.45	B4	Force	Gravity	0.000	7.200	1.130	1.130
DEAD	N+3.45	B5	Force	Gravity	0.000	7.075	1.130	1.130
DEAD	N+3.45	B6	Force	Gravity	0.000	4.630	1.130	1.130
DEAD	N+3.45	B12	Force	Gravity	0.000	7.200	5.360	5.360
DEAD	N+3.45	B13	Force	Gravity	0.000	7.075	5.360	5.360
DEAD	N+3.45	B14	Force	Gravity	0.000	7.325	5.360	5.360
DEAD	N+3.45	B15	Force	Gravity	0.000	6.950	5.360	5.360
DEAD	N+3.45	B17	Force	Gravity	0.000	3.900	5.360	5.360
DEAD	N+3.45	B18	Force	Gravity	0.000	2.500	5.360	5.360
DEAD	N+3.45	B19	Force	Gravity	0.000	3.100	5.360	5.360
DEAD	N+3.45	B23	Force	Gravity	0.000	2.100	78.600	78.600
DEAD	N+3.45	B28	Force	Gravity	0.000	7.000	5.360	5.360
DEAD	N+3.45	B30	Force	Gravity	0.000	7.000	5.360	5.360
DEAD	N+3.45	B122	Force	Gravity	0.000	3.326	5.360	5.360
DEAD	N+3.45	B124	Force	Gravity	0.000	4.830	0.940	0.940
DEAD	N+3.45	B126	Force	Gravity	0.000	4.830	0.940	0.940
LIVE	N+3.45	B23	Force	Gravity	0.000	2.100	42.800	42.800

ETABS v9.7.4 File:BARRIO OBRERO Units:KN-m octubre 4, 2016 9:41 PAGE 15

U N I F O R M L O A D A S S I G N M E N T S T O A R E A O B J E C T S

CASE	STORY	AREA	AREATYPE	DIRECTION	LOAD
DEAD	N+6.65	F116	Floor	Gravity	0.3500
DEAD	N+6.65	F117	Floor	Gravity	0.3500
DEAD	N+6.65	F118	Floor	Gravity	0.3500
LIVE	N+6.65	F27	Floor	Gravity	0.3500
LIVE	N+6.65	F28	Floor	Gravity	0.3500



PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO CLL 17 N° 3N-102
IPIALES (NARIÑO)
DATOS DE ENTRADA DEL MODELO ESTRUCTURAL

LIVE	N+6.65	F29	Floor	Gravity	0.3500
LIVE	N+6.65	F30	Floor	Gravity	0.3500
LIVE	N+6.65	F33	Floor	Gravity	0.3500
LIVE	N+6.65	F34	Floor	Gravity	0.3500
LIVE	N+6.65	F35	Floor	Gravity	0.3500
LIVE	N+6.65	F36	Floor	Gravity	0.3500
LIVE	N+6.65	F41	Floor	Gravity	0.3500
LIVE	N+6.65	F43	Floor	Gravity	0.3500
LIVE	N+6.65	F45	Floor	Gravity	0.3500
LIVE	N+6.65	F46	Floor	Gravity	0.3500
LIVE	N+6.65	F47	Floor	Gravity	0.3500
LIVE	N+6.65	F116	Floor	Gravity	0.3500
LIVE	N+6.65	F117	Floor	Gravity	0.3500
LIVE	N+6.65	F118	Floor	Gravity	0.3500
LIVE	N+3.45	F36	Floor	Gravity	2.0000
LIVE	N+3.45	F52	Floor	Gravity	0.3500
LIVE	N+3.45	F54	Floor	Gravity	5.0000
LIVE	N+3.45	F55	Floor	Gravity	5.0000
LIVE	N+3.45	F56	Floor	Gravity	5.0000
LIVE	N+3.45	F57	Floor	Gravity	5.0000
LIVE	N+3.45	F58	Floor	Gravity	5.0000
LIVE	N+3.45	F61	Floor	Gravity	5.0000
LIVE	N+3.45	F62	Floor	Gravity	5.0000
LIVE	N+3.45	F63	Floor	Gravity	2.0000
LIVE	N+3.45	F64	Floor	Gravity	2.0000
LIVE	N+3.45	F65	Floor	Gravity	2.0000
LIVE	N+3.45	F66	Floor	Gravity	2.0000
LIVE	N+3.45	F67	Floor	Gravity	2.0000
LIVE	N+3.45	F68	Floor	Gravity	2.0000
LIVE	N+3.45	F69	Floor	Gravity	2.0000
LIVE	N+3.45	F70	Floor	Gravity	2.0000
LIVE	N+3.45	F75	Floor	Gravity	2.0000
LIVE	N+3.45	F76	Floor	Gravity	2.0000
LIVE	N+3.45	F77	Floor	Gravity	2.0000
LIVE	N+3.45	F78	Floor	Gravity	2.0000
LIVE	N+3.45	F79	Floor	Gravity	2.0000
LIVE	N+3.45	F80	Floor	Gravity	2.0000
LIVE	N+3.45	F81	Floor	Gravity	2.0000
LIVE	N+3.45	F82	Floor	Gravity	2.0000
LIVE	N+3.45	F105	Floor	Gravity	5.0000
LIVE	N+3.45	F106	Floor	Gravity	2.0000
LIVE	N+3.45	F107	Floor	Gravity	2.0000
LIVE	N+3.45	F115	Floor	Gravity	2.0000
LIVE	N+3.45	F119	Floor	Gravity	2.0000
LIVE	N+3.45	F120	Floor	Gravity	2.0000
LIVE	N+3.45	F125	Floor	Gravity	2.0000
LIVE	N+3.45	F126	Floor	Gravity	2.0000
LIVE	N+3.45	F127	Floor	Gravity	2.0000
LIVE	N+3.45	F128	Floor	Gravity	2.0000

FUERZAS EN VIGAS

BEAM FORCES

UNID: kN-m

Story	Beam	Load	Loc	V2	T	M3
N+3.45	B1	ENVOLVENTE MAX	0	-0.16	0.801	27.115
N+3.45	B1	ENVOLVENTE MAX	3.475	10.17	0.801	15.665
N+3.45	B1	ENVOLVENTE MAX	6.95	23.68	0.801	24.199
N+3.45	B1	ENVOLVENTE MIN	0	-22.45	-0.744	-40.691
N+3.45	B1	ENVOLVENTE MIN	3.475	-9.13	-0.744	10.055
N+3.45	B1	ENVOLVENTE MIN	6.95	1	-0.744	-44.971
N+6.65	B2	ENVOLVENTE MAX	0	-4.08	0.719	7.395
N+6.65	B2	ENVOLVENTE MAX	3.475	6.4	0.719	6.426
N+6.65	B2	ENVOLVENTE MAX	6.95	19.91	0.719	3.208
N+6.65	B2	ENVOLVENTE MIN	0	-17.92	-0.584	-34.213
N+6.65	B2	ENVOLVENTE MIN	3.475	-4.75	-0.584	3.758
N+6.65	B2	ENVOLVENTE MIN	6.95	5.38	-0.584	-41.461
N+3.45	B2	ENVOLVENTE MAX	0	-61.35	12.27	-45.899
N+3.45	B2	ENVOLVENTE MAX	3.475	-6.71	12.27	125.227
N+3.45	B2	ENVOLVENTE MAX	3.475	38.61	-2.597	125.488
N+3.45	B2	ENVOLVENTE MAX	6.95	121.58	-2.597	-48.236
N+3.45	B2	ENVOLVENTE MIN	0	-120.48	3.428	-158.697
N+3.45	B2	ENVOLVENTE MIN	3.475	-37.51	3.428	71.954
N+3.45	B2	ENVOLVENTE MIN	3.475	7.51	-13.192	72.406
N+3.45	B2	ENVOLVENTE MIN	6.95	62.15	-13.192	-162.539
N+6.65	B3	ENVOLVENTE MAX	0	-2.6	5.578	3.374
N+6.65	B3	ENVOLVENTE MAX	1.35	1.33	5.578	4.238
N+6.65	B3	ENVOLVENTE MAX	2.7	5.27	5.578	9.746
N+6.65	B3	ENVOLVENTE MIN	0	-23.22	-3.411	-38.825
N+6.65	B3	ENVOLVENTE MIN	1.35	-17.97	-3.411	-11.028
N+6.65	B3	ENVOLVENTE MIN	2.7	-12.72	-3.411	-0.274
N+3.45	B3	ENVOLVENTE MAX	0	-15.02	2.752	-15.063
N+3.45	B3	ENVOLVENTE MAX	1.35	0.43	2.752	-4.074
N+3.45	B3	ENVOLVENTE MAX	2.7	15.88	2.752	0.923
N+3.45	B3	ENVOLVENTE MIN	0	-66.92	-19.161	-125.394
N+3.45	B3	ENVOLVENTE MIN	1.35	-44.5	-19.161	-48.285
N+3.45	B3	ENVOLVENTE MIN	2.7	-22.08	-19.161	-22.376
N+6.65	B4	ENVOLVENTE MAX	0	-5	-0.127	8.278
N+6.65	B4	ENVOLVENTE MAX	3.6	5.5	-0.127	9.955
N+6.65	B4	ENVOLVENTE MAX	7.2	19.48	-0.127	0.441
N+6.65	B4	ENVOLVENTE MIN	0	-17.88	-0.886	-32.33
N+6.65	B4	ENVOLVENTE MIN	3.6	-3.88	-0.886	5.422
N+6.65	B4	ENVOLVENTE MIN	7.2	6.63	-0.886	-36.129
N+3.45	B4	ENVOLVENTE MAX	0	-13.92	8.934	13.883
N+3.45	B4	ENVOLVENTE MAX	3.6	9.25	8.934	57.292
N+3.45	B4	ENVOLVENTE MAX	3.6	21.77	-1.959	57.066
N+3.45	B4	ENVOLVENTE MAX	7.2	69.51	-1.959	-2.837
N+3.45	B4	ENVOLVENTE MIN	0	-62.25	1.321	-95.703
N+3.45	B4	ENVOLVENTE MIN	3.6	-16.67	1.321	20.131
N+3.45	B4	ENVOLVENTE MIN	3.6	-4.97	-8.975	20.011
N+3.45	B4	ENVOLVENTE MIN	7.2	18.2	-8.975	-113.053
N+6.65	B5	ENVOLVENTE MAX	0	-5.98	0.124	3.792
N+6.65	B5	ENVOLVENTE MAX	3.538	4.34	0.124	10.495
N+6.65	B5	ENVOLVENTE MAX	7.075	18.1	0.124	2.166
N+6.65	B5	ENVOLVENTE MIN	0	-17.59	-0.534	-28.385
N+6.65	B5	ENVOLVENTE MIN	3.538	-3.85	-0.534	6.553
N+6.65	B5	ENVOLVENTE MIN	7.075	6.47	-0.534	-30.279
N+3.45	B5	ENVOLVENTE MAX	0	-12.59	10.584	7.438
N+3.45	B5	ENVOLVENTE MAX	3.538	10.1	10.584	36.228
N+3.45	B5	ENVOLVENTE MAX	3.538	17.71	-2.683	36.351
N+3.45	B5	ENVOLVENTE MAX	7.075	64.23	-2.683	-5.351
N+3.45	B5	ENVOLVENTE MIN	0	-57.13	2.478	-91.801
N+3.45	B5	ENVOLVENTE MIN	3.538	-12.01	2.478	10.644
N+3.45	B5	ENVOLVENTE MIN	3.538	-6.17	-10.592	10.713
N+3.45	B5	ENVOLVENTE MIN	7.075	16.52	-10.592	-112.948
N+6.65	B6	ENVOLVENTE MAX	0	-8.38	3.134	-3.202
N+6.65	B6	ENVOLVENTE MAX	3.663	2.3	3.134	13.685
N+6.65	B6	ENVOLVENTE MAX	4.625	5.12	3.134	17.671
N+6.65	B6	ENVOLVENTE MAX	4.625	12.86	1.47	16.377
N+6.65	B6	ENVOLVENTE MAX	7.325	23.36	1.47	-1.548
N+6.65	B6	ENVOLVENTE MIN	0	-21.1	-0.165	-38.746
N+6.65	B6	ENVOLVENTE MIN	3.663	-6.86	-0.165	6.699
N+6.65	B6	ENVOLVENTE MIN	4.625	-3.13	-0.165	3.942



N+6.65	B6	ENVOLVENTE MIN	4.625	0.4	-3.239	4.104
N+6.65	B6	ENVOLVENTE MIN	7.325	8.27	-3.239	-38.591
N+3.45	B6	ENVOLVENTE MAX	0	-34.79	3.496	-36.325
N+3.45	B6	ENVOLVENTE MAX	3.663	-11.14	3.496	122.93
N+3.45	B6	ENVOLVENTE MAX	3.663	-18.91	10.988	119.636
N+3.45	B6	ENVOLVENTE MAX	4.625	-13.71	10.988	177.417
N+3.45	B6	ENVOLVENTE MAX	4.625	151.33	0.036	205.762
N+3.45	B6	ENVOLVENTE MAX	7.325	211.85	0.036	-95.74
N+3.45	B6	ENVOLVENTE MIN	0	-107.78	-4.217	-175.235
N+3.45	B6	ENVOLVENTE MIN	3.663	-53.55	-4.217	46.625
N+3.45	B6	ENVOLVENTE MIN	3.663	-66.98	1.17	45.283
N+3.45	B6	ENVOLVENTE MIN	4.625	-57.73	1.17	61.574
N+3.45	B6	ENVOLVENTE MIN	4.625	55.26	-13.525	79.642
N+3.45	B6	ENVOLVENTE MIN	7.325	80.96	-13.525	-292.725
N+6.65	B7	ENVOLVENTE MAX	0	-3.93	0.171	7.857
N+6.65	B7	ENVOLVENTE MAX	3.475	7.46	0.171	7.677
N+6.65	B7	ENVOLVENTE MAX	6.95	20.97	0.171	2.461
N+6.65	B7	ENVOLVENTE MIN	0	-16.31	-0.418	-26.139
N+6.65	B7	ENVOLVENTE MIN	3.475	-4.06	-0.418	3.913
N+6.65	B7	ENVOLVENTE MIN	6.95	6.07	-0.418	-44.349
N+6.65	B8	ENVOLVENTE MAX	0	-5.72	0.717	5.498
N+6.65	B8	ENVOLVENTE MAX	3.6	4.78	0.717	9.765
N+6.65	B8	ENVOLVENTE MAX	7.2	18.29	0.717	3.731
N+6.65	B8	ENVOLVENTE MIN	0	-19.27	0.094	-37.48
N+6.65	B8	ENVOLVENTE MIN	3.6	-5.28	0.094	5.365
N+6.65	B8	ENVOLVENTE MIN	7.2	5.71	0.094	-32.152
N+3.45	B8	ENVOLVENTE MAX	0	-41.97	9.946	-23.584
N+3.45	B8	ENVOLVENTE MAX	3.6	-4.69	9.946	116.284
N+3.45	B8	ENVOLVENTE MAX	3.6	50.25	-0.212	119.895
N+3.45	B8	ENVOLVENTE MAX	7.2	127.25	-0.212	-50.873
N+3.45	B8	ENVOLVENTE MIN	0	-111.45	4.095	-154.844
N+3.45	B8	ENVOLVENTE MIN	3.6	-34.53	4.095	52.575
N+3.45	B8	ENVOLVENTE MIN	3.6	10.59	-4.666	54.352
N+3.45	B8	ENVOLVENTE MIN	7.2	47.87	-4.666	-200.009
N+6.65	B9	ENVOLVENTE MAX	0	-5.7	0.208	4.142
N+6.65	B9	ENVOLVENTE MAX	3.538	4.67	0.208	9.714
N+6.65	B9	ENVOLVENTE MAX	7.075	18.42	0.208	3.164
N+6.65	B9	ENVOLVENTE MIN	0	-17.94	-0.355	-30.32
N+6.65	B9	ENVOLVENTE MIN	3.538	-4.24	-0.355	6.063
N+6.65	B9	ENVOLVENTE MIN	7.075	6.08	-0.355	-32.38
N+3.45	B9	ENVOLVENTE MAX	0	-51.2	11.824	-53.314
N+3.45	B9	ENVOLVENTE MAX	3.538	-14.95	11.824	130.095
N+3.45	B9	ENVOLVENTE MAX	3.538	55.85	-3.926	129.859
N+3.45	B9	ENVOLVENTE MAX	7.075	133.8	-3.926	-61.706
N+3.45	B9	ENVOLVENTE MIN	0	-129.15	3.648	-191.414
N+3.45	B9	ENVOLVENTE MIN	3.538	-52	3.648	63.669
N+3.45	B9	ENVOLVENTE MIN	3.538	17.58	-11.662	63.846
N+3.45	B9	ENVOLVENTE MIN	7.075	53.83	-11.662	-206.36
N+6.65	B10	ENVOLVENTE MAX	0	-6.35	-0.005	2.81
N+6.65	B10	ENVOLVENTE MAX	3.663	4.33	-0.005	10.001
N+6.65	B10	ENVOLVENTE MAX	7.325	18.52	-0.005	1.763
N+6.65	B10	ENVOLVENTE MIN	0	-18.37	-0.623	-32.886
N+6.65	B10	ENVOLVENTE MIN	3.663	-4.13	-0.623	6.347
N+6.65	B10	ENVOLVENTE MIN	7.325	6.59	-0.623	-33.291
N+3.45	B10	ENVOLVENTE MAX	0	-60.82	4.618	-71.134
N+3.45	B10	ENVOLVENTE MAX	3.663	-22.49	4.618	170.494
N+3.45	B10	ENVOLVENTE MAX	3.663	68.11	1.917	173.828
N+3.45	B10	ENVOLVENTE MAX	7.325	153.87	1.917	-77.517
N+3.45	B10	ENVOLVENTE MIN	0	-150.55	-0.826	-225.543
N+3.45	B10	ENVOLVENTE MIN	3.663	-65.59	-0.826	81.204
N+3.45	B10	ENVOLVENTE MIN	3.663	24.77	-4.862	82.759
N+3.45	B10	ENVOLVENTE MIN	7.325	63.1	-4.862	-232.39
N+6.65	B11	ENVOLVENTE MAX	0	-3.69	0.311	8.963
N+6.65	B11	ENVOLVENTE MAX	3.475	7.63	0.311	7.889
N+6.65	B11	ENVOLVENTE MAX	6.95	21.14	0.311	2.736
N+6.65	B11	ENVOLVENTE MIN	0	-16.47	-0.222	-26.815
N+6.65	B11	ENVOLVENTE MIN	3.475	-4.14	-0.222	4.176
N+6.65	B11	ENVOLVENTE MIN	6.95	6	-0.222	-44.829
N+3.45	B11	ENVOLVENTE MAX	0	-53.27	7.097	-59.303
N+3.45	B11	ENVOLVENTE MAX	3.475	-18.04	7.097	135.918
N+3.45	B11	ENVOLVENTE MAX	3.475	46.19	-0.976	135.359
N+3.45	B11	ENVOLVENTE MAX	6.95	118.21	-0.976	-25.457
N+3.45	B11	ENVOLVENTE MIN	0	-137.6	0.34	-213.997
N+3.45	B11	ENVOLVENTE MIN	3.475	-62.82	0.34	64.462
N+3.45	B11	ENVOLVENTE MIN	3.475	9.3	-10.09	64.743



N+3.45	B11	ENVOLVENTE MIN	6.95	44.53	-10.09	-160.364
N+6.65	B12	ENVOLVENTE MAX	0	-10.11	0.738	-5.382
N+6.65	B12	ENVOLVENTE MAX	3.6	0.38	0.738	14.058
N+6.65	B12	ENVOLVENTE MAX	7.2	13.09	0.738	4.491
N+6.65	B12	ENVOLVENTE MIN	0	-20.73	-2.112	-43.976
N+6.65	B12	ENVOLVENTE MIN	3.6	-6.73	-2.112	3.525
N+6.65	B12	ENVOLVENTE MIN	7.2	5.05	-2.112	-8.148
N+3.45	B12	ENVOLVENTE MAX	0	-51.1	3.213	-44.937
N+3.45	B12	ENVOLVENTE MAX	3.6	-5.46	3.213	84.011
N+3.45	B12	ENVOLVENTE MAX	3.6	20.32	1.358	80.669
N+3.45	B12	ENVOLVENTE MAX	7.2	87.65	1.358	-40.871
N+3.45	B12	ENVOLVENTE MIN	0	-96.97	-6.983	-160.506
N+3.45	B12	ENVOLVENTE MIN	3.6	-29.64	-6.983	40.245
N+3.45	B12	ENVOLVENTE MIN	3.6	-0.77	-3.477	38.514
N+3.45	B12	ENVOLVENTE MIN	7.2	44.87	-3.477	-113.685
N+6.65	B13	ENVOLVENTE MAX	0	-4.89	0.877	7.062
N+6.65	B13	ENVOLVENTE MAX	3.538	5.42	0.877	8.393
N+6.65	B13	ENVOLVENTE MAX	7.075	18.84	0.877	6.529
N+6.65	B13	ENVOLVENTE MIN	0	-19.78	0.101	-39.611
N+6.65	B13	ENVOLVENTE MIN	3.538	-6.02	0.101	4.667
N+6.65	B13	ENVOLVENTE MIN	7.075	4.63	0.101	-34.84
N+3.45	B13	ENVOLVENTE MAX	0	-58.84	-2.239	-35.804
N+3.45	B13	ENVOLVENTE MAX	3.538	-2.28	-2.239	124.669
N+3.45	B13	ENVOLVENTE MAX	3.538	52.58	11.128	125.727
N+3.45	B13	ENVOLVENTE MAX	7.075	138.63	11.128	-72.05
N+3.45	B13	ENVOLVENTE MIN	0	-123.69	-9.029	-171.977
N+3.45	B13	ENVOLVENTE MIN	3.538	-37.64	-9.029	68.854
N+3.45	B13	ENVOLVENTE MIN	3.538	11.67	3.481	68.785
N+3.45	B13	ENVOLVENTE MIN	7.075	68.23	3.481	-220.208
N+6.65	B14	ENVOLVENTE MAX	0	-5.82	0.49	5.348
N+6.65	B14	ENVOLVENTE MAX	3.663	4.91	0.49	11.04
N+6.65	B14	ENVOLVENTE MAX	7.325	19.15	0.49	3.944
N+6.65	B14	ENVOLVENTE MIN	0	-18.67	-0.361	-32.675
N+6.65	B14	ENVOLVENTE MIN	3.663	-4.48	-0.361	7.08
N+6.65	B14	ENVOLVENTE MIN	7.325	6.2	-0.361	-34.383
N+3.45	B14	ENVOLVENTE MAX	0	-67.59	-4.027	-71.945
N+3.45	B14	ENVOLVENTE MAX	3.663	-8.43	-4.027	119.365
N+3.45	B14	ENVOLVENTE MAX	3.663	42.58	12.097	119.453
N+3.45	B14	ENVOLVENTE MAX	7.325	132.81	12.097	-74.701
N+3.45	B14	ENVOLVENTE MIN	0	-132.11	-11.478	-208.207
N+3.45	B14	ENVOLVENTE MIN	3.663	-42.01	-11.478	65.617
N+3.45	B14	ENVOLVENTE MIN	3.663	9.3	3.373	65.739
N+3.45	B14	ENVOLVENTE MIN	7.325	68.46	3.373	-210.555
N+6.65	B15	ENVOLVENTE MAX	0	-3.25	-0.098	10.097
N+6.65	B15	ENVOLVENTE MAX	3.475	7.65	-0.098	7.356
N+6.65	B15	ENVOLVENTE MAX	6.95	21.16	-0.098	4.981
N+6.65	B15	ENVOLVENTE MIN	0	-17.61	-0.807	-31.096
N+6.65	B15	ENVOLVENTE MIN	3.475	-4.87	-0.807	3.789
N+6.65	B15	ENVOLVENTE MIN	6.95	5.26	-0.807	-45.324
N+3.45	B15	ENVOLVENTE MAX	0	-66.6	-3.317	-67.58
N+3.45	B15	ENVOLVENTE MAX	3.475	-11.34	-3.317	127.456
N+3.45	B15	ENVOLVENTE MAX	3.475	38.86	13.738	126.836
N+3.45	B15	ENVOLVENTE MAX	6.95	122.88	13.738	-33.179
N+3.45	B15	ENVOLVENTE MIN	0	-140.36	-10.163	-219.858
N+3.45	B15	ENVOLVENTE MIN	3.475	-56.34	-10.163	67.55
N+3.45	B15	ENVOLVENTE MIN	3.475	3.65	3.078	68.383
N+3.45	B15	ENVOLVENTE MIN	6.95	58.91	3.078	-167.667
N+3.45	B16	ENVOLVENTE MAX	0	-20.76	12.222	0.785
N+3.45	B16	ENVOLVENTE MAX	3.475	0.58	12.222	58.306
N+3.45	B16	ENVOLVENTE MAX	3.475	9.93	-5.292	58.251
N+3.45	B16	ENVOLVENTE MAX	6.95	42.48	-5.292	-0.128
N+3.45	B16	ENVOLVENTE MIN	0	-41.97	5.467	-35.77
N+3.45	B16	ENVOLVENTE MIN	3.475	-9.42	5.467	34.467
N+3.45	B16	ENVOLVENTE MIN	3.475	-0.33	-12.464	34.42
N+3.45	B16	ENVOLVENTE MIN	6.95	21.01	-12.464	-37.57
N+6.65	B17	ENVOLVENTE MAX	0	-0.98	0.42	13.039
N+6.65	B17	ENVOLVENTE MAX	1.95	8.94	0.42	7.687
N+6.65	B17	ENVOLVENTE MAX	3.9	24.25	0.42	11.668
N+6.65	B17	ENVOLVENTE MIN	0	-25.57	-1.062	-29.435
N+6.65	B17	ENVOLVENTE MIN	1.95	-9.89	-1.062	2.728
N+6.65	B17	ENVOLVENTE MIN	3.9	0.38	-1.062	-24.341
N+3.45	B17	ENVOLVENTE MAX	0	-0.09	1.203	43.625
N+3.45	B17	ENVOLVENTE MAX	1.95	27.36	1.203	27.598
N+3.45	B17	ENVOLVENTE MAX	3.9	67.61	1.203	30.081
N+3.45	B17	ENVOLVENTE MIN	0	-66.95	-3.979	-81.961



N+3.45	B17	ENVOLVENTE MIN	1.95	-26.78	-3.979	7.862
N+3.45	B17	ENVOLVENTE MIN	3.9	0.58	-3.979	-70.658
N+6.65	B18	ENVOLVENTE MAX	0	10.47	1.17	16.555
N+6.65	B18	ENVOLVENTE MAX	1.25	16.82	1.17	4.234
N+6.65	B18	ENVOLVENTE MAX	2.5	26.58	1.17	21.148
N+6.65	B18	ENVOLVENTE MIN	0	-27.69	0.228	-24.106
N+6.65	B18	ENVOLVENTE MIN	1.25	-17.64	0.228	-0.508
N+6.65	B18	ENVOLVENTE MIN	2.5	-11	0.228	-26.649
N+3.45	B18	ENVOLVENTE MAX	0	33.18	-2.618	44.089
N+3.45	B18	ENVOLVENTE MAX	1.25	46.47	-2.618	11.197
N+3.45	B18	ENVOLVENTE MAX	2.5	64.96	-2.618	71.463
N+3.45	B18	ENVOLVENTE MIN	0	-81.81	-9.327	-79.026
N+3.45	B18	ENVOLVENTE MIN	1.25	-60.18	-9.327	-5.193
N+3.45	B18	ENVOLVENTE MIN	2.5	-43.77	-9.327	-72.109
N+6.65	B19	ENVOLVENTE MAX	0	-21.03	3.52	-22.544
N+6.65	B19	ENVOLVENTE MAX	3.1	-5.34	3.52	30.203
N+6.65	B19	ENVOLVENTE MAX	3.1	1.87	3.488	29.53
N+6.65	B19	ENVOLVENTE MAX	3.5	4.42	3.488	29.726
N+6.65	B19	ENVOLVENTE MAX	7	43.04	3.488	-13.925
N+6.65	B19	ENVOLVENTE MIN	0	-43.6	-4.855	-70.049
N+6.65	B19	ENVOLVENTE MIN	3.1	-18.84	-4.855	14.863
N+6.65	B19	ENVOLVENTE MIN	3.1	-7.91	-1.165	14.162
N+6.65	B19	ENVOLVENTE MIN	3.5	-3.5	-1.165	15.112
N+6.65	B19	ENVOLVENTE MIN	7	19.76	-1.165	-51.105
N+3.45	B19	ENVOLVENTE MAX	0	-89.64	6.825	-87.9
N+3.45	B19	ENVOLVENTE MAX	3.1	-49.45	6.825	211.835
N+3.45	B19	ENVOLVENTE MAX	3.1	64.55	5.233	211.367
N+3.45	B19	ENVOLVENTE MAX	3.5	68.11	5.233	186.482
N+3.45	B19	ENVOLVENTE MAX	7	160.22	5.233	-98.532
N+3.45	B19	ENVOLVENTE MIN	0	-169.44	-24.781	-241.957
N+3.45	B19	ENVOLVENTE MIN	3.1	-110.75	-24.781	118.16
N+3.45	B19	ENVOLVENTE MIN	3.1	26.82	-12.363	115.71
N+3.45	B19	ENVOLVENTE MIN	3.5	29.25	-12.363	103.841
N+3.45	B19	ENVOLVENTE MIN	7	83.4	-12.363	-228.284
N+6.65	B20	ENVOLVENTE MAX	0	14.76	0.846	18.981
N+6.65	B20	ENVOLVENTE MAX	1.25	25.24	0.846	-1.572
N+6.65	B20	ENVOLVENTE MAX	2.5	39	0.846	7.327
N+6.65	B20	ENVOLVENTE MIN	0	-22.38	0.137	-22.164
N+6.65	B20	ENVOLVENTE MIN	1.25	-11.12	0.137	-5.672
N+6.65	B20	ENVOLVENTE MIN	2.5	-3.14	0.137	-45.808
N+3.45	B20	ENVOLVENTE MAX	0	9.91	-0.515	-2.472
N+3.45	B20	ENVOLVENTE MAX	1.25	19.56	-0.515	-11.392
N+3.45	B20	ENVOLVENTE MAX	2.5	29.21	-0.515	88.987
N+3.45	B20	ENVOLVENTE MIN	0	-118.6	-3.5	-155.821
N+3.45	B20	ENVOLVENTE MIN	1.25	-97.92	-3.5	-26.033
N+3.45	B20	ENVOLVENTE MIN	2.5	-77.24	-3.5	-51.378
N+6.65	B21	ENVOLVENTE MAX	0	-21.02	0.07	-21.459
N+6.65	B21	ENVOLVENTE MAX	3.5	1.4	0.07	24.886
N+6.65	B21	ENVOLVENTE MAX	7	40.68	0.07	-8.579
N+6.65	B21	ENVOLVENTE MIN	0	-47.33	-0.568	-70.353
N+6.65	B21	ENVOLVENTE MIN	3.5	-6.63	-0.568	11.024
N+6.65	B21	ENVOLVENTE MIN	7	16.81	-0.568	-46.605
N+3.45	B21	ENVOLVENTE MAX	0	-91.27	9.31	-98.034
N+3.45	B21	ENVOLVENTE MAX	3.1	-52.85	9.31	214.219
N+3.45	B21	ENVOLVENTE MAX	3.1	64.27	8.295	213.866
N+3.45	B21	ENVOLVENTE MAX	3.5	67.84	8.295	188.568
N+3.45	B21	ENVOLVENTE MAX	7	161.34	8.295	-93.91
N+3.45	B21	ENVOLVENTE MIN	0	-180.04	-7.585	-253.635
N+3.45	B21	ENVOLVENTE MIN	3.1	-113.45	-7.585	112.312
N+3.45	B21	ENVOLVENTE MIN	3.1	24.17	-4.401	110.792
N+3.45	B21	ENVOLVENTE MIN	3.5	26.61	-4.401	100.694
N+3.45	B21	ENVOLVENTE MIN	7	80.8	-4.401	-227.348
N+6.65	B22	ENVOLVENTE MAX	0	16.13	0.293	20.839
N+6.65	B22	ENVOLVENTE MAX	1.25	27.11	0.293	-2.817
N+6.65	B22	ENVOLVENTE MAX	2.5	40.94	0.293	2.258
N+6.65	B22	ENVOLVENTE MIN	0	-18.94	-0.963	-19.645
N+6.65	B22	ENVOLVENTE MIN	1.25	-8.09	-0.963	-6.12
N+6.65	B22	ENVOLVENTE MIN	2.5	-0.08	-0.963	-48.619
N+3.45	B22	ENVOLVENTE MAX	0	8.18	6.846	-4.537
N+3.45	B22	ENVOLVENTE MAX	1.25	17.83	6.846	-11.157
N+3.45	B22	ENVOLVENTE MAX	2.5	27.48	6.846	85.763
N+3.45	B22	ENVOLVENTE MIN	0	-116.44	1.497	-153.642
N+3.45	B22	ENVOLVENTE MIN	1.25	-95.76	1.497	-26.692
N+3.45	B22	ENVOLVENTE MIN	2.5	-75.08	1.497	-49.115
N+6.65	B23	ENVOLVENTE MAX	0	-0.03	2.051	6.283



N+6.65	B23	ENVOLVENTE MAX	1.837	12.84	2.051	6.852
N+6.65	B23	ENVOLVENTE MAX	2.22	15.94	2.051	6.425
N+6.65	B23	ENVOLVENTE MAX	2.22	21.83	9.923	7.067
N+6.65	B23	ENVOLVENTE MAX	3.674	30.77	9.923	-4.971
N+6.65	B23	ENVOLVENTE MIN	0	-11.24	-3.182	-1.545
N+6.65	B23	ENVOLVENTE MIN	1.837	0.13	-3.182	-3.67
N+6.65	B23	ENVOLVENTE MIN	2.22	2.09	-3.182	-9.179
N+6.65	B23	ENVOLVENTE MIN	2.22	5.12	-1.424	-7.966
N+6.65	B23	ENVOLVENTE MIN	3.674	11.31	-1.424	-46.112
N+3.45	B23	ENVOLVENTE MAX	0	-80.55	36.378	23.082
N+3.45	B23	ENVOLVENTE MAX	1.837	119.98	36.378	105.947
N+3.45	B23	ENVOLVENTE MAX	3.674	188.82	36.378	-56.065
N+3.45	B23	ENVOLVENTE MIN	0	-205.1	1.723	1.562
N+3.45	B23	ENVOLVENTE MIN	1.837	39.56	1.723	30.356
N+3.45	B23	ENVOLVENTE MIN	3.674	73.92	1.723	-225.834
N+6.65	B24	ENVOLVENTE MAX	0	-19.69	0.491	-17.405
N+6.65	B24	ENVOLVENTE MAX	3.5	2.65	0.491	23.542
N+6.65	B24	ENVOLVENTE MAX	7	41.11	0.491	-7.877
N+6.65	B24	ENVOLVENTE MIN	0	-46.44	-0.116	-72.385
N+6.65	B24	ENVOLVENTE MIN	3.5	-6.88	-0.116	9.988
N+6.65	B24	ENVOLVENTE MIN	7	16.28	-0.116	-52.354
N+3.45	B24	ENVOLVENTE MAX	0	-89.86	7.721	-91.975
N+3.45	B24	ENVOLVENTE MAX	3.1	-51.44	7.721	215.711
N+3.45	B24	ENVOLVENTE MAX	3.1	65.78	5.47	215.208
N+3.45	B24	ENVOLVENTE MAX	3.5	69.35	5.47	190.028
N+3.45	B24	ENVOLVENTE MAX	7	160.91	5.47	-86.112
N+3.45	B24	ENVOLVENTE MIN	0	-181.3	-10.187	-263.183
N+3.45	B24	ENVOLVENTE MIN	3.1	-114.88	-10.187	112.213
N+3.45	B24	ENVOLVENTE MIN	3.1	22.11	-7.237	110.391
N+3.45	B24	ENVOLVENTE MIN	3.5	24.54	-7.237	101.104
N+3.45	B24	ENVOLVENTE MIN	7	78.67	-7.237	-230.724
N+6.65	B25	ENVOLVENTE MAX	0	9.12	0.36	18.559
N+6.65	B25	ENVOLVENTE MAX	1.25	17.1	0.36	3.032
N+6.65	B25	ENVOLVENTE MAX	2.5	29.17	0.36	20.005
N+6.65	B25	ENVOLVENTE MIN	0	-34.76	-0.416	-33.509
N+6.65	B25	ENVOLVENTE MIN	1.25	-21	-0.416	0.476
N+6.65	B25	ENVOLVENTE MIN	2.5	-11.33	-0.416	-25.213
N+3.45	B25	ENVOLVENTE MAX	0	29.59	1.172	11.138
N+3.45	B25	ENVOLVENTE MAX	1.25	39.24	1.172	-28.86
N+3.45	B25	ENVOLVENTE MAX	2.5	51.73	1.172	40.663
N+3.45	B25	ENVOLVENTE MIN	0	-91.03	-2.988	-149.339
N+3.45	B25	ENVOLVENTE MIN	1.25	-70.35	-2.988	-49.173
N+3.45	B25	ENVOLVENTE MIN	2.5	-52.5	-2.988	-101.092
N+6.65	B26	ENVOLVENTE MAX	0	-11.2	3.95	-3.386
N+6.65	B26	ENVOLVENTE MAX	3.5	9.86	3.95	20.034
N+6.65	B26	ENVOLVENTE MAX	3.674	11.44	3.95	20.082
N+6.65	B26	ENVOLVENTE MAX	3.674	6.45	0.155	21.241
N+6.65	B26	ENVOLVENTE MAX	7	32.8	0.155	-0.026
N+6.65	B26	ENVOLVENTE MIN	0	-34.73	-0.26	-47.179
N+6.65	B26	ENVOLVENTE MIN	3.5	-4.69	-0.26	0.741
N+6.65	B26	ENVOLVENTE MIN	3.674	-3.73	-0.26	-0.428
N+6.65	B26	ENVOLVENTE MIN	3.674	-6.19	-5.936	0.581
N+6.65	B26	ENVOLVENTE MIN	7	10.6	-5.936	-50.755
N+6.65	B28	ENVOLVENTE MAX	0	-13.46	0.389	-5.376
N+6.65	B28	ENVOLVENTE MAX	3.5	4.18	0.389	16.797
N+6.65	B28	ENVOLVENTE MAX	7	31.35	0.389	-0.296
N+6.65	B28	ENVOLVENTE MIN	0	-34.76	-0.316	-59.19
N+6.65	B28	ENVOLVENTE MIN	3.5	-7	-0.316	8.121
N+6.65	B28	ENVOLVENTE MIN	7	11.23	-0.316	-44.524
N+3.45	B28	ENVOLVENTE MAX	0	-54.53	-5.647	-29.036
N+3.45	B28	ENVOLVENTE MAX	3.1	-14.34	-5.647	115.064
N+3.45	B28	ENVOLVENTE MAX	3.1	30.96	25.358	115.771
N+3.45	B28	ENVOLVENTE MAX	3.5	36.35	25.358	104.728
N+3.45	B28	ENVOLVENTE MAX	7	111.26	25.358	-33.621
N+3.45	B28	ENVOLVENTE MIN	0	-117.47	-31.394	-179.941
N+3.45	B28	ENVOLVENTE MIN	3.1	-59.08	-31.394	56.374
N+3.45	B28	ENVOLVENTE MIN	3.1	-4.43	7.812	55.523
N+3.45	B28	ENVOLVENTE MIN	3.5	-0.51	7.812	56.533
N+3.45	B28	ENVOLVENTE MIN	7	50.16	7.812	-161.582
N+6.65	B29	ENVOLVENTE MAX	0	14.88	0.414	23.212
N+6.65	B29	ENVOLVENTE MAX	1.25	21.18	0.414	0.692
N+6.65	B29	ENVOLVENTE MAX	2.5	30.05	0.414	25.799
N+6.65	B29	ENVOLVENTE MIN	0	-34.94	-0.334	-37.948
N+6.65	B29	ENVOLVENTE MIN	1.25	-25.02	-0.334	-0.486

N+6.65	B29	ENVOLVENTE MIN	2.5	-17.68	-0.334	-30.921
N+3.45	B29	ENVOLVENTE MAX	0	54.33	1.971	46.074
N+3.45	B29	ENVOLVENTE MAX	1.25	61.58	1.971	-23.681
N+3.45	B29	ENVOLVENTE MAX	2.5	73.68	1.971	52.18
N+3.45	B29	ENVOLVENTE MIN	0	-79.9	-1.693	-128.61
N+3.45	B29	ENVOLVENTE MIN	1.25	-66.32	-1.693	-38.965
N+3.45	B29	ENVOLVENTE MIN	2.5	-57.57	-1.693	-122.889
N+6.65	B30	ENVOLVENTE MAX	0	-11.7	0.496	-2.212
N+6.65	B30	ENVOLVENTE MAX	3.5	5.94	0.496	18.799
N+6.65	B30	ENVOLVENTE MAX	7	33.57	0.496	2.357
N+6.65	B30	ENVOLVENTE MIN	0	-33.79	-0.248	-50.871
N+6.65	B30	ENVOLVENTE MIN	3.5	-6.02	-0.248	7.87
N+6.65	B30	ENVOLVENTE MIN	7	11.75	-0.248	-54.84
N+3.45	B30	ENVOLVENTE MAX	0	-56.7	-7.091	-46.235
N+3.45	B30	ENVOLVENTE MAX	3.5	-7.83	-7.091	118.423
N+3.45	B30	ENVOLVENTE MAX	3.674	-6.23	-7.091	124.364
N+3.45	B30	ENVOLVENTE MAX	3.674	55.81	27.83	125.702
N+3.45	B30	ENVOLVENTE MAX	7	120.21	27.83	-49.967
N+3.45	B30	ENVOLVENTE MIN	0	-114.87	-29.352	-167.861
N+3.45	B30	ENVOLVENTE MIN	3.5	-43.01	-29.352	67.518
N+3.45	B30	ENVOLVENTE MIN	3.674	-40.85	-29.352	68.978
N+3.45	B30	ENVOLVENTE MIN	3.674	16.12	7.312	71.513
N+3.45	B30	ENVOLVENTE MIN	7	60.26	7.312	-179.175
N+6.65	B35	ENVOLVENTE MAX	0	7.45	-0.149	-0.12
N+6.65	B35	ENVOLVENTE MAX	0.825	14.28	-0.149	-5.166
N+6.65	B35	ENVOLVENTE MAX	1.65	21.47	-0.149	-13.801
N+6.65	B35	ENVOLVENTE MIN	0	3.87	-9.465	-0.285
N+6.65	B35	ENVOLVENTE MIN	0.825	8.27	-9.465	-9.234
N+6.65	B35	ENVOLVENTE MIN	1.65	12.66	-9.465	-23.84
N+3.45	B35	ENVOLVENTE MAX	0	28.06	2.598	1.639
N+3.45	B35	ENVOLVENTE MAX	0.825	35.51	2.598	-11.468
N+3.45	B35	ENVOLVENTE MAX	1.65	42.96	2.598	-28.548
N+3.45	B35	ENVOLVENTE MIN	0	12.78	-26.845	0.701
N+3.45	B35	ENVOLVENTE MIN	0.825	17.85	-26.845	-24.36
N+3.45	B35	ENVOLVENTE MIN	1.65	22.93	-26.845	-57.163
N+6.65	B36	ENVOLVENTE MAX	0	16.94	4.986	0.277
N+6.65	B36	ENVOLVENTE MAX	0.825	26.98	4.986	-11.212
N+6.65	B36	ENVOLVENTE MAX	1.65	38.31	4.986	-27.869
N+6.65	B36	ENVOLVENTE MIN	0	10.5	-4.35	0.117
N+6.65	B36	ENVOLVENTE MIN	0.825	16.96	-4.35	-17.852
N+6.65	B36	ENVOLVENTE MIN	1.65	23.42	-4.35	-44.256
N+3.45	B36	ENVOLVENTE MAX	0	68.66	17.213	5.599
N+3.45	B36	ENVOLVENTE MAX	0.825	80.09	17.213	-30.161
N+3.45	B36	ENVOLVENTE MAX	1.65	91.53	17.213	-70.575
N+3.45	B36	ENVOLVENTE MIN	0	37.95	-13.878	2.956
N+3.45	B36	ENVOLVENTE MIN	0.825	44.89	-13.878	-54.776
N+3.45	B36	ENVOLVENTE MIN	1.65	51.84	-13.878	-126.552
N+6.65	B37	ENVOLVENTE MAX	0	16.49	4.933	0.276
N+6.65	B37	ENVOLVENTE MAX	0.825	26.48	4.933	-10.913
N+6.65	B37	ENVOLVENTE MAX	1.65	37.69	4.933	-27.245
N+6.65	B37	ENVOLVENTE MIN	0	10.16	-4.468	0.119
N+6.65	B37	ENVOLVENTE MIN	0.825	16.59	-4.468	-17.461
N+6.65	B37	ENVOLVENTE MIN	1.65	23.01	-4.468	-43.428
N+3.45	B37	ENVOLVENTE MAX	0	68.45	14.528	5.411
N+3.45	B37	ENVOLVENTE MAX	0.825	79.88	14.528	-29.948
N+3.45	B37	ENVOLVENTE MAX	1.65	91.31	14.528	-70.084
N+3.45	B37	ENVOLVENTE MIN	0	37.61	-16.232	2.795
N+3.45	B37	ENVOLVENTE MIN	0.825	44.55	-16.232	-54.791
N+3.45	B37	ENVOLVENTE MIN	1.65	51.5	-16.232	-126.393
N+6.65	B38	ENVOLVENTE MAX	0	7.55	10.549	-0.117
N+6.65	B38	ENVOLVENTE MAX	0.825	14.36	10.549	-5.155
N+6.65	B38	ENVOLVENTE MAX	1.65	21.47	10.549	-13.759
N+6.65	B38	ENVOLVENTE MIN	0	3.89	0.512	-0.267
N+6.65	B38	ENVOLVENTE MIN	0.825	8.25	0.512	-9.286
N+6.65	B38	ENVOLVENTE MIN	1.65	12.61	0.512	-23.923
N+3.45	B38	ENVOLVENTE MAX	0	26.7	23.401	2.237
N+3.45	B38	ENVOLVENTE MAX	0.825	34.15	23.401	-9.425
N+3.45	B38	ENVOLVENTE MAX	1.65	41.59	23.401	-24.919
N+3.45	B38	ENVOLVENTE MIN	0	10.86	-6.589	0.844
N+3.45	B38	ENVOLVENTE MIN	0.825	15.93	-6.589	-22.951
N+3.45	B38	ENVOLVENTE MIN	1.65	21.01	-6.589	-54.628
N+6.65	B41	ENVOLVENTE MAX	0	-3.97	0.126	-0.617
N+6.65	B41	ENVOLVENTE MAX	3.475	1.17	0.126	6.871
N+6.65	B41	ENVOLVENTE MAX	6.95	8.09	0.126	-1.423



N+6.65	B41	ENVOLVENTE MIN	0	-7.68	-0.113	-8.81
N+6.65	B41	ENVOLVENTE MIN	3.475	-0.84	-0.113	4.36
N+6.65	B41	ENVOLVENTE MIN	6.95	4.23	-0.113	-10.33
N+6.65	B42	ENVOLVENTE MAX	0	-12.13	8.81	-13.109
N+6.65	B42	ENVOLVENTE MAX	0.81	-8.05	8.81	-4.937
N+6.65	B42	ENVOLVENTE MAX	1.62	-3.97	8.81	0.126
N+6.65	B42	ENVOLVENTE MIN	0	-20.57	0.617	-22.714
N+6.65	B42	ENVOLVENTE MIN	0.81	-14.03	0.617	-8.783
N+6.65	B42	ENVOLVENTE MIN	1.62	-7.68	0.617	-0.113
N+6.65	B43	ENVOLVENTE MAX	0	-12.39	-1.423	-13.542
N+6.65	B43	ENVOLVENTE MAX	0.81	-8.31	-1.423	-5.157
N+6.65	B43	ENVOLVENTE MAX	1.62	-4.23	-1.423	0.113
N+6.65	B43	ENVOLVENTE MIN	0	-21.01	-10.33	-23.388
N+6.65	B43	ENVOLVENTE MIN	0.81	-14.43	-10.33	-9.127
N+6.65	B43	ENVOLVENTE MIN	1.62	-8.09	-10.33	-0.126
N+6.65	B50	ENVOLVENTE MAX	0	-15.75	6.379	-22.61
N+6.65	B50	ENVOLVENTE MAX	1.11	-10.13	6.379	-8.247
N+6.65	B50	ENVOLVENTE MAX	2.22	-4.51	6.379	-0.055
N+6.65	B50	ENVOLVENTE MIN	0	-26.15	1.231	-36.855
N+6.65	B50	ENVOLVENTE MIN	1.11	-16.53	1.231	-13.66
N+6.65	B50	ENVOLVENTE MIN	2.22	-7.79	1.231	-0.201
N+6.65	B51	ENVOLVENTE MAX	0	-20.44	0.954	-29.848
N+6.65	B51	ENVOLVENTE MAX	1.11	-13.88	0.954	-10.8
N+6.65	B51	ENVOLVENTE MAX	2.22	-7.32	0.954	1.362
N+6.65	B51	ENVOLVENTE MIN	0	-35.41	-5.895	-50.04
N+6.65	B51	ENVOLVENTE MIN	1.11	-23.15	-5.895	-18.675
N+6.65	B51	ENVOLVENTE MIN	2.22	-12.95	-5.895	0.758
N+3.45	B62	ENVOLVENTE MAX	0	-29.55	0.812	-11.358
N+3.45	B62	ENVOLVENTE MAX	3.1	3.74	0.812	45.225
N+3.45	B62	ENVOLVENTE MAX	3.1	-5.65	0.498	44.901
N+3.45	B62	ENVOLVENTE MAX	3.5	-4	0.498	50.009
N+3.45	B62	ENVOLVENTE MAX	7	75.93	0.498	-38.432
N+3.45	B62	ENVOLVENTE MIN	0	-55.81	-0.716	-40.414
N+3.45	B62	ENVOLVENTE MIN	3.1	0.42	-0.716	22.146
N+3.45	B62	ENVOLVENTE MIN	3.1	-13.85	-0.573	23.444
N+3.45	B62	ENVOLVENTE MIN	3.5	-11.25	-0.573	26.655
N+3.45	B62	ENVOLVENTE MIN	7	40.44	-0.573	-76.162
N+3.45	B63	ENVOLVENTE MAX	0	-21.36	3.294	-34.794
N+3.45	B63	ENVOLVENTE MAX	1.25	-14.13	3.294	-11.371
N+3.45	B63	ENVOLVENTE MAX	2.5	-6.91	3.294	11.838
N+3.45	B63	ENVOLVENTE MIN	0	-56.56	1.238	-74.24
N+3.45	B63	ENVOLVENTE MIN	1.25	-34.43	1.238	-18.353
N+3.45	B63	ENVOLVENTE MIN	2.5	-14.3	1.238	0.462
N+3.45	B121	ENVOLVENTE MAX	0	-56.77	41.302	-52.58
N+3.45	B121	ENVOLVENTE MAX	1.837	-31.79	41.302	50.067
N+3.45	B121	ENVOLVENTE MAX	3.674	-6.81	41.302	135.624
N+3.45	B121	ENVOLVENTE MIN	0	-122.08	11.925	-169.365
N+3.45	B121	ENVOLVENTE MIN	1.837	-82.27	11.925	10.923
N+3.45	B121	ENVOLVENTE MIN	3.674	-42.47	11.925	61.489
N+3.45	B122	ENVOLVENTE MAX	0	56.34	0.358	127.167
N+3.45	B122	ENVOLVENTE MAX	1.663	88.54	0.358	32.486



N+3.45	B122	ENVOLVENTE MAX	3.326	120.74	0.358	-55.447
N+3.45	B122	ENVOLVENTE MIN	0	14.89	-24.476	57.978
N+3.45	B122	ENVOLVENTE MIN	1.663	36.97	-24.476	-5.256
N+3.45	B122	ENVOLVENTE MIN	3.326	59.04	-24.476	-176.84
N+3.45	B123	ENVOLVENTE MAX	0	-32.53	20.571	-17.101
N+3.45	B123	ENVOLVENTE MAX	0.75	-28.07	20.571	5.891
N+3.45	B123	ENVOLVENTE MAX	1.5	-23.61	20.571	26.919
N+3.45	B123	ENVOLVENTE MIN	0	-85.95	-4.956	-134.61
N+3.45	B123	ENVOLVENTE MIN	0.75	-79.45	-4.956	-72.332
N+3.45	B123	ENVOLVENTE MIN	1.5	-72.94	-4.956	-17.354
N+3.45	B124	ENVOLVENTE MAX	0	1.84	-3.952	19.827
N+3.45	B124	ENVOLVENTE MAX	2.415	16.7	-3.952	31.422
N+3.45	B124	ENVOLVENTE MAX	4.83	38.99	-3.952	40.907
N+3.45	B124	ENVOLVENTE MIN	0	-35.66	-15.417	-27.952
N+3.45	B124	ENVOLVENTE MIN	2.415	-13.71	-15.417	-2.322
N+3.45	B124	ENVOLVENTE MIN	4.83	0.8	-15.417	-63.463
N+3.45	B125	ENVOLVENTE MAX	0	-27.92	4.432	-6.209
N+3.45	B125	ENVOLVENTE MAX	0.75	-23.46	4.432	13.31
N+3.45	B125	ENVOLVENTE MAX	1.5	-19	4.432	31.052
N+3.45	B125	ENVOLVENTE MIN	0	-91.23	-21.945	-145.843
N+3.45	B125	ENVOLVENTE MIN	0.75	-84.73	-21.945	-79.587
N+3.45	B125	ENVOLVENTE MIN	1.5	-78.22	-21.945	-20.82
N+3.45	B126	ENVOLVENTE MAX	0	4.72	15.854	23.837
N+3.45	B126	ENVOLVENTE MAX	2.415	19.65	15.854	34.62
N+3.45	B126	ENVOLVENTE MAX	4.83	41.94	15.854	50.921
N+3.45	B126	ENVOLVENTE MIN	0	-38.45	4.33	-31.362
N+3.45	B126	ENVOLVENTE MIN	2.415	-16.58	4.33	-5.118
N+3.45	B126	ENVOLVENTE MIN	4.83	-2.06	4.33	-73.274
N+3.45	B150	ENVOLVENTE MAX	0	-44.11	0.992	-50.917
N+3.45	B150	ENVOLVENTE MAX	3.538	-3.17	0.992	60.602
N+3.45	B150	ENVOLVENTE MAX	3.538	13.55	-0.115	60.393
N+3.45	B150	ENVOLVENTE MAX	7.075	87.66	-0.115	-57.177
N+3.45	B150	ENVOLVENTE MIN	0	-82.44	0.057	-99.341
N+3.45	B150	ENVOLVENTE MIN	3.538	-7.98	0.057	31.586
N+3.45	B150	ENVOLVENTE MIN	3.538	5.02	-0.982	31.562
N+3.45	B150	ENVOLVENTE MIN	7.075	45.96	-0.982	-118.018
N+3.45	B152	ENVOLVENTE MAX	0	-46.27	0.604	-56.96
N+3.45	B152	ENVOLVENTE MAX	3.663	-2.79	0.604	58.767
N+3.45	B152	ENVOLVENTE MAX	3.663	8.96	0.443	58.669
N+3.45	B152	ENVOLVENTE MAX	7.325	87.54	0.443	-57.85
N+3.45	B152	ENVOLVENTE MIN	0	-87.43	-0.388	-116.44
N+3.45	B152	ENVOLVENTE MIN	3.663	-8.93	-0.388	31.224
N+3.45	B152	ENVOLVENTE MIN	3.663	2.91	-0.738	31.454
N+3.45	B152	ENVOLVENTE MIN	7.325	46.39	-0.738	-116.93
N+3.45	B153	ENVOLVENTE MAX	0	-45.44	1.164	-54.906
N+3.45	B153	ENVOLVENTE MAX	3.475	-5.75	1.164	65.5
N+3.45	B153	ENVOLVENTE MAX	3.475	0.91	0.71	66.907
N+3.45	B153	ENVOLVENTE MAX	6.95	69.45	0.71	-13.97
N+3.45	B153	ENVOLVENTE MIN	0	-88.52	0.109	-116.773
N+3.45	B153	ENVOLVENTE MIN	3.475	-17.27	0.109	33.928
N+3.45	B153	ENVOLVENTE MIN	3.475	-5.57	-0.853	33.212
N+3.45	B153	ENVOLVENTE MIN	6.95	34.8	-0.853	-56.241
N+3.45	B160	ENVOLVENTE MAX	0	-30.26	0.477	-10.979
N+3.45	B160	ENVOLVENTE MAX	3.1	2.28	0.477	48.855
N+3.45	B160	ENVOLVENTE MAX	3.1	-3.86	1.093	48.669
N+3.45	B160	ENVOLVENTE MAX	3.5	-2.2	1.093	53.505
N+3.45	B160	ENVOLVENTE MAX	7	75.96	1.093	-36.932
N+3.45	B160	ENVOLVENTE MIN	0	-58.02	-1.438	-46.183
N+3.45	B160	ENVOLVENTE MIN	3.1	-1.4	-1.438	23.271
N+3.45	B160	ENVOLVENTE MIN	3.1	-13.62	-0.291	25.211
N+3.45	B160	ENVOLVENTE MIN	3.5	-11.09	-0.291	28.326
N+3.45	B160	ENVOLVENTE MIN	7	40.34	-0.291	-73.763
N+3.45	B166	ENVOLVENTE MAX	0	-10.11	0.07	-20.696
N+3.45	B166	ENVOLVENTE MAX	1.25	-2.88	0.07	-7.494
N+3.45	B166	ENVOLVENTE MAX	2.5	15.12	0.07	-5.238
N+3.45	B166	ENVOLVENTE MIN	0	-29.14	-0.216	-36.685
N+3.45	B166	ENVOLVENTE MIN	1.25	-8.32	-0.216	-15.171
N+3.45	B166	ENVOLVENTE MIN	2.5	1	-0.216	-21.098
N+3.45	B167	ENVOLVENTE MAX	0	-29.27	1.142	-10.587
N+3.45	B167	ENVOLVENTE MAX	3.1	4.13	1.142	45.97
N+3.45	B167	ENVOLVENTE MAX	3.1	-6.95	0.65	46.652
N+3.45	B167	ENVOLVENTE MAX	3.5	-5.29	0.65	53.427
N+3.45	B167	ENVOLVENTE MAX	7	71.37	0.65	-28.398
N+3.45	B167	ENVOLVENTE MIN	0	-55.39	-0.765	-38.374



N+3.45	B167	ENVOLVENTE MIN	3.1	0.76	-0.765	21.938
N+3.45	B167	ENVOLVENTE MIN	3.1	-18.02	-0.378	23.815
N+3.45	B167	ENVOLVENTE MIN	3.5	-15.3	-0.378	27.97
N+3.45	B167	ENVOLVENTE MIN	7	37.87	-0.378	-57.388
N+3.45	B168	ENVOLVENTE MAX	0	-18.49	-1.623	3.083
N+3.45	B168	ENVOLVENTE MAX	1.95	7.09	-1.623	41.974
N+3.45	B168	ENVOLVENTE MAX	3.9	50.1	-1.623	-13.799
N+3.45	B168	ENVOLVENTE MIN	0	-39.5	-3.45	-4.734
N+3.45	B168	ENVOLVENTE MIN	1.95	3.07	-3.45	21.692
N+3.45	B168	ENVOLVENTE MIN	3.9	27.6	-3.45	-27.424
N+3.45	B169	ENVOLVENTE MAX	0	-5.63	0.322	-7.277
N+3.45	B169	ENVOLVENTE MAX	1.25	2.31	0.322	3.368
N+3.45	B169	ENVOLVENTE MAX	2.5	22.81	0.322	-3.326
N+3.45	B169	ENVOLVENTE MIN	0	-21.45	0.005	-15.026
N+3.45	B169	ENVOLVENTE MIN	1.25	-2.75	0.005	-4.907
N+3.45	B169	ENVOLVENTE MIN	2.5	4.47	0.005	-17.863
N+6.65	B214	ENVOLVENTE MAX	0	-4.51	-0.055	-1.231
N+6.65	B214	ENVOLVENTE MAX	3.538	0.65	-0.055	8.28
N+6.65	B214	ENVOLVENTE MAX	7.075	8.26	-0.055	-2.702
N+6.65	B214	ENVOLVENTE MIN	0	-7.79	-0.201	-6.379
N+6.65	B214	ENVOLVENTE MIN	3.538	-0.35	-0.201	4.824
N+6.65	B214	ENVOLVENTE MIN	7.075	4.81	-0.201	-6.982
N+6.65	B215	ENVOLVENTE MAX	0	-1.85	1.232	0.118
N+6.65	B215	ENVOLVENTE MAX	2.313	1.87	1.232	1.501
N+6.65	B215	ENVOLVENTE MAX	4.625	6.36	1.232	-0.763
N+6.65	B215	ENVOLVENTE MIN	0	-4.96	0.621	-4.861
N+6.65	B215	ENVOLVENTE MIN	2.313	-0.81	0.621	0.408
N+6.65	B215	ENVOLVENTE MIN	4.625	2.56	0.621	-8.869
N+6.65	B224	ENVOLVENTE MAX	0	-3.87	0.285	-0.149
N+6.65	B224	ENVOLVENTE MAX	3.538	1.35	0.285	5.97
N+6.65	B224	ENVOLVENTE MAX	7.075	8.6	0.285	-3.936
N+6.65	B224	ENVOLVENTE MIN	0	-7.45	0.12	-9.465
N+6.65	B224	ENVOLVENTE MIN	3.538	-0.54	0.12	3.258
N+6.65	B224	ENVOLVENTE MIN	7.075	4.61	0.12	-11.382
N+3.45	B224	ENVOLVENTE MAX	0	-12.78	-0.701	2.598
N+3.45	B224	ENVOLVENTE MAX	3.538	6.01	-0.701	26.546
N+3.45	B224	ENVOLVENTE MAX	3.538	7.57	2.754	25.707
N+3.45	B224	ENVOLVENTE MAX	7.075	35.37	2.754	-18.12
N+3.45	B224	ENVOLVENTE MIN	0	-28.06	-1.639	-26.845
N+3.45	B224	ENVOLVENTE MIN	3.538	-1.69	-1.639	13.816
N+3.45	B224	ENVOLVENTE MIN	3.538	0.49	1.396	13.451
N+3.45	B224	ENVOLVENTE MIN	7.075	17.93	1.396	-51.116
N+6.65	B225	ENVOLVENTE MAX	0	-4.83	0.084	-4.353
N+6.65	B225	ENVOLVENTE MAX	3.663	0.51	0.084	5.486
N+6.65	B225	ENVOLVENTE MAX	7.325	8.28	0.084	-4.246
N+6.65	B225	ENVOLVENTE MIN	0	-8.34	-0.073	-10.329
N+6.65	B225	ENVOLVENTE MIN	3.663	-0.57	-0.073	3.509
N+6.65	B225	ENVOLVENTE MIN	7.325	4.79	-0.073	-10.043
N+3.45	B225	ENVOLVENTE MAX	0	-17.69	-1.465	-18.763
N+3.45	B225	ENVOLVENTE MAX	3.663	0.5	-1.465	20.955
N+3.45	B225	ENVOLVENTE MAX	3.663	4.03	2.847	20.918
N+3.45	B225	ENVOLVENTE MAX	7.325	33.49	2.847	-18.789
N+3.45	B225	ENVOLVENTE MIN	0	-33.29	-2.845	-47.138
N+3.45	B225	ENVOLVENTE MIN	3.663	-3.5	-2.845	10.427
N+3.45	B225	ENVOLVENTE MIN	3.663	-0.7	1.378	10.411
N+3.45	B225	ENVOLVENTE MIN	7.325	17.49	1.378	-48.349
N+6.65	B226	ENVOLVENTE MAX	0	-4.31	-0.117	-3.266
N+6.65	B226	ENVOLVENTE MAX	3.475	0.78	-0.117	5.517
N+6.65	B226	ENVOLVENTE MAX	6.95	7.55	-0.117	-0.512
N+6.65	B226	ENVOLVENTE MIN	0	-8.21	-0.267	-10.558
N+6.65	B226	ENVOLVENTE MIN	3.475	-1.18	-0.267	2.903
N+6.65	B226	ENVOLVENTE MIN	6.95	3.89	-0.267	-10.549
N+3.45	B226	ENVOLVENTE MAX	0	-17.89	-1.361	-18.33
N+3.45	B226	ENVOLVENTE MAX	3.475	-0.83	-1.361	24.754
N+3.45	B226	ENVOLVENTE MAX	3.475	1.49	2.237	24.987
N+3.45	B226	ENVOLVENTE MAX	6.95	26.7	2.237	6.589
N+3.45	B226	ENVOLVENTE MIN	0	-34.95	-2.568	-50.513
N+3.45	B226	ENVOLVENTE MIN	3.475	-7.53	-2.568	12.241
N+3.45	B226	ENVOLVENTE MIN	3.475	-8.12	0.844	11.941
N+3.45	B226	ENVOLVENTE MIN	6.95	10.86	0.844	-23.401
N+3.45	B227	ENVOLVENTE MAX	0	0.3	0.455	-2.158
N+3.45	B227	ENVOLVENTE MAX	0.825	8.69	0.455	-0.623
N+3.45	B227	ENVOLVENTE MAX	1.65	17.17	0.455	-4.482
N+3.45	B227	ENVOLVENTE MIN	0	-4.05	-1.658	-4.369
N+3.45	B227	ENVOLVENTE MIN	0.825	1.38	-1.658	-7.068



N+3.45	B227	ENVOLVENTE MIN	1.65	6.72	-1.658	-18.601
N+3.45	B228	ENVOLVENTE MAX	0	-0.61	0.839	-2.966
N+3.45	B228	ENVOLVENTE MAX	0.825	7.22	0.839	-0.462
N+3.45	B228	ENVOLVENTE MAX	1.65	15.7	0.839	-3.389
N+3.45	B228	ENVOLVENTE MIN	0	-5.73	-0.891	-5.688
N+3.45	B228	ENVOLVENTE MIN	0.825	0.26	-0.891	-7.08
N+3.45	B228	ENVOLVENTE MIN	1.65	5.59	-0.891	-17.408
N+3.45	B229	ENVOLVENTE MAX	0	2.24	0.903	-2.26
N+3.45	B229	ENVOLVENTE MAX	0.825	10.72	0.903	-0.668
N+3.45	B229	ENVOLVENTE MAX	1.65	19.2	0.903	-4.504
N+3.45	B229	ENVOLVENTE MIN	0	-3.98	-0.97	-4.683
N+3.45	B229	ENVOLVENTE MIN	0.825	1.36	-0.97	-9.15
N+3.45	B229	ENVOLVENTE MIN	1.65	6.7	-0.97	-22.362
N+3.45	B240	ENVOLVENTE MAX	0	-53.88	-1.487	-61.8
N+3.45	B240	ENVOLVENTE MAX	1.738	-36.26	-1.487	21.72
N+3.45	B240	ENVOLVENTE MAX	3.475	-18.65	-1.487	132.296
N+3.45	B240	ENVOLVENTE MIN	0	-137.14	-8.092	-211.403
N+3.45	B240	ENVOLVENTE MIN	1.738	-97.7	-8.092	-12.709
N+3.45	B240	ENVOLVENTE MIN	3.475	-60.98	-8.092	64.197
N+3.45	B241	ENVOLVENTE MAX	0	43.92	9.293	131.536
N+3.45	B241	ENVOLVENTE MAX	1.738	77.38	9.293	55.495
N+3.45	B241	ENVOLVENTE MAX	3.475	115.88	9.293	-26.028
N+3.45	B241	ENVOLVENTE MIN	0	8.91	0.819	64.324
N+3.45	B241	ENVOLVENTE MIN	1.738	26.53	0.819	-0.809
N+3.45	B241	ENVOLVENTE MIN	3.475	44.14	0.819	-154.95
N+3.45	B242	ENVOLVENTE MAX	0	-6.41	0.223	-34.472
N+3.45	B242	ENVOLVENTE MAX	1.25	0.92	0.223	-28.582
N+3.45	B242	ENVOLVENTE MAX	2.5	22.16	0.223	-32.678
N+3.45	B242	ENVOLVENTE MIN	0	-22.1	-0.119	-61.794
N+3.45	B242	ENVOLVENTE MIN	1.25	-1.17	-0.119	-45.586
N+3.45	B242	ENVOLVENTE MIN	2.5	6.05	-0.119	-61.874
N+3.45	B245	ENVOLVENTE MAX	0	-1.2	1.181	-7.562
N+3.45	B245	ENVOLVENTE MAX	0.75	4.57	1.181	-7.077
N+3.45	B245	ENVOLVENTE MAX	1.5	12.02	1.181	-10.77
N+3.45	B245	ENVOLVENTE MIN	0	-3.82	-1.092	-17.824
N+3.45	B245	ENVOLVENTE MIN	0.75	2.13	-1.092	-17.9
N+3.45	B245	ENVOLVENTE MIN	1.5	6.68	-1.092	-24.676
N+3.45	B246	ENVOLVENTE MAX	0	-44.67	-1.261	-27.829
N+3.45	B246	ENVOLVENTE MAX	1.738	-23.05	-1.261	58.04
N+3.45	B246	ENVOLVENTE MAX	3.475	-1.44	-1.261	101.003
N+3.45	B246	ENVOLVENTE MIN	0	-87.71	-3.18	-70.971
N+3.45	B246	ENVOLVENTE MIN	1.738	-49.24	-3.18	29.47
N+3.45	B246	ENVOLVENTE MIN	3.475	-12.35	-3.18	52.273
N+3.45	B247	ENVOLVENTE MAX	0	6.7	2.967	101.436
N+3.45	B247	ENVOLVENTE MAX	1.738	43.39	2.967	69.534
N+3.45	B247	ENVOLVENTE MAX	3.475	81.86	2.967	-14.699
N+3.45	B247	ENVOLVENTE MIN	0	-0.62	0.043	51.537
N+3.45	B247	ENVOLVENTE MIN	1.738	21	0.043	29.513
N+3.45	B247	ENVOLVENTE MIN	3.475	42.61	0.043	-56.886
N+3.45	B248	ENVOLVENTE MAX	0	-40.34	0.227	-38.774
N+3.45	B248	ENVOLVENTE MAX	3.5	6.42	0.227	48.223
N+3.45	B248	ENVOLVENTE MAX	3.674	7.19	0.227	47.03
N+3.45	B248	ENVOLVENTE MAX	3.674	-3.79	0.283	43.157
N+3.45	B248	ENVOLVENTE MAX	7	58.29	0.283	-17.527
N+3.45	B248	ENVOLVENTE MIN	0	-73.1	-0.998	-74.042
N+3.45	B248	ENVOLVENTE MIN	3.5	0.75	-0.998	28.554
N+3.45	B248	ENVOLVENTE MIN	3.674	1.25	-0.998	28.062
N+3.45	B248	ENVOLVENTE MIN	3.674	-8.49	-0.606	23.302
N+3.45	B248	ENVOLVENTE MIN	7	32.16	-0.606	-39.648



FUERZAS EN COLUMNAS

COLUMN FORCES

UNID: kN-m

Story	Column	Load	Loc	P	V2	V3	T	M2	M3
N+6.65	C1	ENVOLVENTE MAX	0.000	-43.180	-8.340	23.590	1.044	46.466	-33.411
N+6.65	C1	ENVOLVENTE MAX	1.600	-37.650	-8.340	23.590	1.044	11.504	-9.929
N+6.65	C1	ENVOLVENTE MAX	3.200	-32.120	-8.340	23.590	1.044	13.808	48.938
N+6.65	C1	ENVOLVENTE MIN	0.000	-80.520	-42.790	-3.870	-1.142	1.347	-88.181
N+6.65	C1	ENVOLVENTE MIN	1.6	-73.15	-42.79	-3.87	-1.142	4.753	-29.854
N+6.65	C1	ENVOLVENTE MIN	3.2	-65.78	-42.79	-3.87	-1.142	-29.107	-6.912
N+3.45	C1	ENVOLVENTE MAX	0	-243.06	9.98	53.31	1.813	92.658	41.003
N+3.45	C1	ENVOLVENTE MAX	1.75	-237.01	9.98	53.31	1.813	2.676	30.915
N+3.45	C1	ENVOLVENTE MAX	3.5	-230.96	9.98	53.31	1.813	45.497	116.686
N+3.45	C1	ENVOLVENTE MIN	0	-405.89	-61.03	-33.75	-1.89	-72.627	-96.926
N+3.45	C1	ENVOLVENTE MIN	1.75	-397.82	-61.03	-33.75	-1.89	-16.891	2.493
N+3.45	C1	ENVOLVENTE MIN	3.5	-389.76	-61.03	-33.75	-1.89	-93.957	6.053
N+6.65	C2	ENVOLVENTE MAX	0	-44.96	45.38	26.11	1.044	49.781	93.64
N+6.65	C2	ENVOLVENTE MAX	1.6	-39.43	45.38	26.11	1.044	11.246	31.112
N+6.65	C2	ENVOLVENTE MAX	3.2	-33.9	45.38	26.11	1.044	18.289	1.572
N+6.65	C2	ENVOLVENTE MIN	0	-84.62	12.07	-6.72	-1.142	-3.341	39.968
N+6.65	C2	ENVOLVENTE MIN	1.6	-77.25	12.07	-6.72	-1.142	4.164	10.565
N+6.65	C2	ENVOLVENTE MIN	3.2	-69.88	12.07	-6.72	-1.142	-33.908	-51.826
N+3.45	C2	ENVOLVENTE MAX	0	-235.12	63.64	61.24	1.813	108.559	102.868
N+3.45	C2	ENVOLVENTE MAX	1.75	-229.07	63.64	61.24	1.813	4.502	-1.348
N+3.45	C2	ENVOLVENTE MAX	3.5	-223.03	63.64	61.24	1.813	59.335	-9.936
N+3.45	C2	ENVOLVENTE MIN	0	-410.88	-7.45	-42.71	-1.89	-90.161	-36.04
N+3.45	C2	ENVOLVENTE MIN	1.75	-402.82	-7.45	-42.71	-1.89	-18.522	-30.149
N+3.45	C2	ENVOLVENTE MIN	3.5	-394.76	-7.45	-42.71	-1.89	-105.774	-119.886
N+3.45	C3	ENVOLVENTE MAX	0	-16.52	21.67	40.16	1.813	77.604	52.738
N+3.45	C3	ENVOLVENTE MAX	1.75	-10.47	21.67	40.16	1.813	8.945	16.706
N+3.45	C3	ENVOLVENTE MAX	3.5	-4.42	21.67	40.16	1.813	40.334	56.061
N+3.45	C3	ENVOLVENTE MIN	0	-74.1	-34.43	-31.56	-1.89	-70.136	-64.427
N+3.45	C3	ENVOLVENTE MIN	1.75	-66.04	-34.43	-31.56	-1.89	-16.518	-6.078
N+3.45	C3	ENVOLVENTE MIN	3.5	-57.98	-34.43	-31.56	-1.89	-62.947	-23.115
N+3.45	C4	ENVOLVENTE MAX	0	-22.49	37.89	47.67	1.813	93.039	71.844
N+3.45	C4	ENVOLVENTE MAX	1.75	-16.44	37.89	47.67	1.813	11.3	7.014
N+3.45	C4	ENVOLVENTE MAX	3.5	-10.39	37.89	47.67	1.813	51.521	19.81
N+3.45	C4	ENVOLVENTE MIN	0	-70.29	-19.26	-39.4	-1.89	-86.375	-47.615
N+3.45	C4	ENVOLVENTE MIN	1.75	-62.22	-19.26	-39.4	-1.89	-19.116	-15.377
N+3.45	C4	ENVOLVENTE MIN	3.5	-54.16	-19.26	-39.4	-1.89	-73.817	-60.766
N+6.65	C5	ENVOLVENTE MAX	0	-29.81	0.41	45.25	1.044	103.403	-10.064
N+6.65	C5	ENVOLVENTE MAX	1.6	-24.28	0.41	45.25	1.044	34.466	0.785
N+6.65	C5	ENVOLVENTE MAX	3.2	-18.75	0.41	45.25	1.044	-1.572	38.65
N+6.65	C5	ENVOLVENTE MIN	0	-63.9	-25.4	13.49	-1.142	40.468	-42.958
N+6.65	C5	ENVOLVENTE MIN	1.6	-56.52	-25.4	13.49	-1.142	6.271	-13.82
N+6.65	C5	ENVOLVENTE MIN	3.2	-49.15	-25.4	13.49	-1.142	-51.679	-11.699
N+3.45	C5	ENVOLVENTE MAX	0	-140.74	22.38	68.32	1.813	107.327	56.456
N+3.45	C5	ENVOLVENTE MAX	1.75	-134.7	22.38	68.32	1.813	-1.063	20.117
N+3.45	C5	ENVOLVENTE MAX	3.5	-128.65	22.38	68.32	1.813	1.062	71.246
N+3.45	C5	ENVOLVENTE MIN	0	-315.85	-42.35	-13.74	-1.89	-47.041	-77.014
N+3.45	C5	ENVOLVENTE MIN	1.75	-307.79	-42.35	-13.74	-1.89	-34.177	-5.729
N+3.45	C5	ENVOLVENTE MIN	3.5	-299.72	-42.35	-13.74	-1.89	-131.827	-21.912
N+6.65	C6	ENVOLVENTE MAX	0	-27.77	37.5	10.38	1.044	5.441	79.869
N+6.65	C6	ENVOLVENTE MAX	1.6	-22.24	37.5	10.38	1.044	-2.446	29.622
N+6.65	C6	ENVOLVENTE MAX	3.2	-16.71	37.5	10.38	1.044	75.556	2.636
N+6.65	C6	ENVOLVENTE MIN	0	-82.93	10.12	-51.01	-1.142	-87.722	33.945
N+6.65	C6	ENVOLVENTE MIN	1.6	-75.55	10.12	-51.01	-1.142	-14.837	4.843
N+6.65	C6	ENVOLVENTE MIN	3.2	-68.18	10.12	-51.01	-1.142	-27.842	-44.357
N+3.45	C6	ENVOLVENTE MAX	0	-115.68	60.35	40.73	1.813	85.911	101.865
N+3.45	C6	ENVOLVENTE MAX	1.75	-109.63	60.35	40.73	1.813	17.928	3.756
N+3.45	C6	ENVOLVENTE MAX	3.5	-103.58	60.35	40.73	1.813	127.853	2.356
N+3.45	C6	ENVOLVENTE MIN	0	-365.9	-14.02	-72.16	-1.89	-124.697	-46.761
N+3.45	C6	ENVOLVENTE MIN	1.75	-357.84	-14.02	-72.16	-1.89	-1.711	-29.728
N+3.45	C6	ENVOLVENTE MIN	3.5	-349.77	-14.02	-72.16	-1.89	-56.634	-109.404
N+6.65	C7	ENVOLVENTE MAX	0	-48.44	27.33	6.96	1.044	0.072	42.359
N+6.65	C7	ENVOLVENTE MAX	1.6	-42.91	27.33	6.96	1.044	-4.164	9.684
N+6.65	C7	ENVOLVENTE MAX	3.2	-37.38	27.33	6.96	1.044	66.087	27.069
N+6.65	C7	ENVOLVENTE MIN	0	-93.03	-12.88	-46.66	-1.142	-83.283	-14.229
N+6.65	C7	ENVOLVENTE MIN	1.6	-85.66	-12.88	-46.66	-1.142	-15.524	-4.675
N+6.65	C7	ENVOLVENTE MIN	3.2	-78.28	-12.88	-46.66	-1.142	-22.252	-45.18
N+3.45	C7	ENVOLVENTE MAX	0	-252.93	43.39	31.62	1.813	68.551	82.445



PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, IPÍALES (NARIÑO)
DATOS DE SALIDA DEL MODELO

N+3.45	C7	ENVOLVENTE MAX	1.75	-246.88	43.39	31.62	1.813	16.951	8.927
N+3.45	C7	ENVOLVENTE MAX	3.5	-240.83	43.39	31.62	1.813	116.536	47.658
N+3.45	C7	ENVOLVENTE MIN	0	-575.79	-33.27	-64.22	-1.89	-108.23	-68.789
N+3.45	C7	ENVOLVENTE MIN	1.75	-567.73	-33.27	-64.22	-1.89	0.407	-12.982
N+3.45	C7	ENVOLVENTE MIN	3.5	-559.67	-33.27	-64.22	-1.89	-42.142	-69.425
N+6.65	C8	ENVOLVENTE MAX	0	-57.56	10.3	6.48	1.044	8.653	4.943
N+6.65	C8	ENVOLVENTE MAX	1.6	-52.03	10.3	6.48	1.044	7.374	1.489
N+6.65	C8	ENVOLVENTE MAX	3.2	-46.5	10.3	6.48	1.044	41.813	37.799
N+6.65	C8	ENVOLVENTE MIN	0	-117.44	-25.94	-21.64	-1.142	-27.512	-45.407
N+6.65	C8	ENVOLVENTE MIN	1.6	-110.07	-25.94	-21.64	-1.142	-1.972	-16.939
N+6.65	C8	ENVOLVENTE MIN	3.2	-102.7	-25.94	-21.64	-1.142	-12.149	-28.235
N+3.45	C8	ENVOLVENTE MAX	0	-74.79	28.34	33.73	1.813	66.196	64.889
N+3.45	C8	ENVOLVENTE MAX	1.75	-68.74	28.34	33.73	1.813	7.193	19.22
N+3.45	C8	ENVOLVENTE MAX	3.5	-62.7	28.34	33.73	1.813	57.1	78.797
N+3.45	C8	ENVOLVENTE MIN	0	-294.57	-46.34	-36.76	-1.89	-71.577	-83.418
N+3.45	C8	ENVOLVENTE MIN	1.75	-286.5	-46.34	-36.76	-1.89	-7.266	-6.258
N+3.45	C8	ENVOLVENTE MIN	3.5	-278.44	-46.34	-36.76	-1.89	-51.866	-34.344
N+6.65	C9	ENVOLVENTE MAX	0	-45.37	19.78	7.35	1.044	9.575	28.657
N+6.65	C9	ENVOLVENTE MAX	1.6	-39.84	19.78	7.35	1.044	6.389	9.886
N+6.65	C9	ENVOLVENTE MAX	3.2	-34.31	19.78	7.35	1.044	33.425	30.29
N+6.65	C9	ENVOLVENTE MIN	0	-106.68	-13.9	-17	-1.142	-21.048	-14.301
N+6.65	C9	ENVOLVENTE MIN	1.6	-99.3	-13.9	-17	-1.142	-2.431	-4.942
N+6.65	C9	ENVOLVENTE MIN	3.2	-91.93	-13.9	-17	-1.142	-14.036	-34.76
N+3.45	C9	ENVOLVENTE MAX	0	-35.61	38.94	35.99	1.813	70.32	77.359
N+3.45	C9	ENVOLVENTE MAX	1.75	-29.56	38.94	35.99	1.813	7.358	10.016
N+3.45	C9	ENVOLVENTE MAX	3.5	-23.51	38.94	35.99	1.813	57.999	45.798
N+3.45	C9	ENVOLVENTE MIN	0	-251.32	-32.48	-37.52	-1.89	-73.535	-67.888
N+3.45	C9	ENVOLVENTE MIN	1.75	-243.25	-32.48	-37.52	-1.89	-7.895	-11.859
N+3.45	C9	ENVOLVENTE MIN	3.5	-235.19	-32.48	-37.52	-1.89	-55.86	-58.954
N+6.65	C10	ENVOLVENTE MAX	0	-8.17	-1.44	13.76	1.044	18.104	-10.999
N+6.65	C10	ENVOLVENTE MAX	1.6	-2.64	-1.44	13.76	1.044	5.29	4.63
N+6.65	C10	ENVOLVENTE MAX	3.2	2.89	-1.44	13.76	1.044	21.597	31.472
N+6.65	C10	ENVOLVENTE MIN	0	-56.1	-20.62	-10.52	-1.142	-12.228	-38.112
N+6.65	C10	ENVOLVENTE MIN	1.6	-48.73	-20.62	-10.52	-1.142	-4.596	-17.272
N+6.65	C10	ENVOLVENTE MIN	3.2	-41.36	-20.62	-10.52	-1.142	-26.085	-8.818
N+3.45	C10	ENVOLVENTE MAX	0	3.18	23.67	40.46	1.813	77.699	59.54
N+3.45	C10	ENVOLVENTE MAX	1.75	9.23	23.67	40.46	1.813	7.51	22.666
N+3.45	C10	ENVOLVENTE MAX	3.5	15.28	23.67	40.46	1.813	58.877	69.172
N+3.45	C10	ENVOLVENTE MIN	0	-193.04	-42.25	-38.75	-1.89	-76.758	-78.737
N+3.45	C10	ENVOLVENTE MIN	1.75	-184.97	-42.25	-38.75	-1.89	-9.553	-9.351
N+3.45	C10	ENVOLVENTE MIN	3.5	-176.91	-42.25	-38.75	-1.89	-63.901	-23.344
N+6.65	C11	ENVOLVENTE MAX	0	-30.5	-7.78	24.06	1.044	37.509	-25.279
N+6.65	C11	ENVOLVENTE MAX	1.6	-24.97	-7.78	24.06	1.044	3.527	0.7
N+6.65	C11	ENVOLVENTE MAX	3.2	-19.45	-7.78	24.06	1.044	33.547	38.474
N+6.65	C11	ENVOLVENTE MIN	0	-62.15	-29.48	-19	-1.142	-27.259	-63.087
N+6.65	C11	ENVOLVENTE MIN	1.6	-54.77	-29.48	-19	-1.142	-1.369	-26.303
N+6.65	C11	ENVOLVENTE MIN	3.2	-47.4	-29.48	-19	-1.142	-39.48	-4.452
N+3.45	C11	ENVOLVENTE MAX	0	-118.16	19.31	47.23	1.813	85.457	56.752
N+3.45	C11	ENVOLVENTE MAX	1.75	-112.12	19.31	47.23	1.813	3.392	29.677
N+3.45	C11	ENVOLVENTE MAX	3.5	-106.07	19.31	47.23	1.813	70.424	94.904
N+3.45	C11	ENVOLVENTE MIN	0	-266.9	-54.17	-43.66	-1.89	-82.375	-94.749
N+3.45	C11	ENVOLVENTE MIN	1.75	-258.84	-54.17	-43.66	-1.89	-6.567	-6.661
N+3.45	C11	ENVOLVENTE MIN	3.5	-250.77	-54.17	-43.66	-1.89	-79.856	-10.875
N+6.65	C12	ENVOLVENTE MAX	0	-43.32	18.72	48.5	1.044	87.47	24.034
N+6.65	C12	ENVOLVENTE MAX	1.6	-37.79	18.72	48.5	1.044	15.018	6.156
N+6.65	C12	ENVOLVENTE MAX	3.2	-32.26	18.72	48.5	1.044	6.862	32.599
N+6.65	C12	ENVOLVENTE MIN	0	-99.53	-16.65	2.33	-1.142	14.284	-21.008
N+6.65	C12	ENVOLVENTE MIN	1.6	-92.16	-16.65	2.33	-1.142	5.415	-6.434
N+6.65	C12	ENVOLVENTE MIN	3.2	-84.79	-16.65	2.33	-1.142	-67.751	-36.181
N+3.45	C12	ENVOLVENTE MAX	0	-266.26	39.38	62.21	1.813	99.845	80.024
N+3.45	C12	ENVOLVENTE MAX	1.75	-260.21	39.38	62.21	1.813	-3.881	11.153
N+3.45	C12	ENVOLVENTE MAX	3.5	-254.16	39.38	62.21	1.813	30.757	57.797
N+3.45	C12	ENVOLVENTE MIN	0	-602.4	-38.56	-25.84	-1.89	-59.678	-77.175
N+3.45	C12	ENVOLVENTE MIN	1.75	-594.33	-38.56	-25.84	-1.89	-19.595	-9.735
N+3.45	C12	ENVOLVENTE MIN	3.5	-586.27	-38.56	-25.84	-1.89	-117.875	-57.811
N+6.65	C13	ENVOLVENTE MAX	0	-39.8	14.41	47.5	1.044	86.53	14.693
N+6.65	C13	ENVOLVENTE MAX	1.6	-34.27	14.41	47.5	1.044	14.943	4.179
N+6.65	C13	ENVOLVENTE MAX	3.2	-28.74	14.41	47.5	1.044	9.573	32.313
N+6.65	C13	ENVOLVENTE MIN	0	-93.94	-19.16	0.48	-1.142	11.08	-29.207
N+6.65	C13	ENVOLVENTE MIN	1.6	-86.57	-19.16	0.48	-1.142	5.913	-11.092
N+6.65	C13	ENVOLVENTE MIN	3.2	-79.19	-19.16	0.48	-1.142	-65.47	-31.625
N+3.45	C13	ENVOLVENTE MAX	0	-276.17	35.6	60.02	1.813	95.695	75.406
N+3.45	C13	ENVOLVENTE MAX	1.75	-270.12	35.6	60.02	1.813	-3.996	14.973
N+3.45	C13	ENVOLVENTE MAX	3.5	-264.07	35.6	60.02	1.813	29.54	67.755
N+3.45	C13	ENVOLVENTE MIN	0	-628.51	-42.66	-24.81	-1.89	-57.293	-81.577



N+3.45	C13	ENVOLVENTE MIN	1.75	-620.45	-42.66	-24.81	-1.89	-19.227	-8.786
N+3.45	C13	ENVOLVENTE MIN	3.5	-612.39	-42.66	-24.81	-1.89	-114.389	-49.209
N+6.65	C14	ENVOLVENTE MAX	0	-46.58	23.86	49.48	1.044	92.262	34.734
N+6.65	C14	ENVOLVENTE MAX	1.6	-41.05	23.86	49.48	1.044	18.709	8.641
N+6.65	C14	ENVOLVENTE MAX	3.2	-35.52	23.86	49.48	1.044	20.091	27.673
N+6.65	C14	ENVOLVENTE MIN	0	-106.78	-12.86	-4.45	-1.142	5.813	-13.649
N+6.65	C14	ENVOLVENTE MIN	1.6	-99.41	-12.86	-4.45	-1.142	7.329	-5.151
N+6.65	C14	ENVOLVENTE MIN	3.2	-92.04	-12.86	-4.45	-1.142	-66.088	-41.78
N+3.45	C14	ENVOLVENTE MAX	0	-266.25	43.34	67.55	1.813	108.964	84.555
N+3.45	C14	ENVOLVENTE MAX	1.75	-260.2	43.34	67.55	1.813	-3.513	9.837
N+3.45	C14	ENVOLVENTE MAX	3.5	-254.16	43.34	67.55	1.813	36.53	51.561
N+3.45	C14	ENVOLVENTE MIN	0	-616.2	-35.91	-29.95	-1.89	-68.285	-74.144
N+3.45	C14	ENVOLVENTE MIN	1.75	-608.13	-35.91	-29.95	-1.89	-21.619	-12.417
N+3.45	C14	ENVOLVENTE MIN	3.5	-600.07	-35.91	-29.95	-1.89	-127.473	-67.133
N+6.65	C15	ENVOLVENTE MAX	0	-29.28	37.48	44.35	1.044	77.854	80.692
N+6.65	C15	ENVOLVENTE MAX	1.6	-23.75	37.48	44.35	1.044	13.862	30.658
N+6.65	C15	ENVOLVENTE MAX	3.2	-18.22	37.48	44.35	1.044	34.111	2.838
N+6.65	C15	ENVOLVENTE MIN	0	-86.3	10.44	-14.9	-1.142	-13.596	34.531
N+6.65	C15	ENVOLVENTE MIN	1.6	-78.92	10.44	-14.9	-1.142	3.27	3.919
N+6.65	C15	ENVOLVENTE MIN	3.2	-71.55	10.44	-14.9	-1.142	-64.106	-44.923
N+3.45	C15	ENVOLVENTE MAX	0	-123.15	62.84	68.26	1.813	116.607	106.871
N+3.45	C15	ENVOLVENTE MAX	1.75	-117.11	62.84	68.26	1.813	0.805	4.596
N+3.45	C15	ENVOLVENTE MAX	3.5	-111.06	62.84	68.26	1.813	62.847	5.621
N+3.45	C15	ENVOLVENTE MIN	0	-365.27	-16.39	-44.2	-1.89	-91.873	-51.794
N+3.45	C15	ENVOLVENTE MIN	1.75	-357.2	-16.39	-44.2	-1.89	-18.175	-30.794
N+3.45	C15	ENVOLVENTE MIN	3.5	-349.14	-16.39	-44.2	-1.89	-122.322	-113.094
N+6.65	C16	ENVOLVENTE MAX	0	-25.8	-15.37	4.08	1.044	-0.244	-32.972
N+6.65	C16	ENVOLVENTE MAX	1.6	-20.27	-15.37	4.08	1.044	5.054	0.071
N+6.65	C16	ENVOLVENTE MAX	3.2	-14.74	-15.37	4.08	1.044	31.545	44.012
N+6.65	C16	ENVOLVENTE MIN	0	-57.39	-32.43	-17.16	-1.142	-23.847	-71.272
N+6.65	C16	ENVOLVENTE MIN	1.6	-50.01	-32.43	-17.16	-1.142	-8.215	-27.836
N+6.65	C16	ENVOLVENTE MIN	3.2	-42.64	-32.43	-17.16	-1.142	-13.775	4.704
N+3.45	C16	ENVOLVENTE MAX	0	-98.89	19.22	34.08	1.813	70.777	61.147
N+3.45	C16	ENVOLVENTE MAX	1.75	-92.85	19.22	34.08	1.813	11.967	33.33
N+3.45	C16	ENVOLVENTE MAX	3.5	-86.8	19.22	34.08	1.813	66.533	104.599
N+3.45	C16	ENVOLVENTE MIN	0	-227.63	-60.3	-42.16	-1.89	-81.034	-106.505
N+3.45	C16	ENVOLVENTE MIN	1.75	-219.56	-60.3	-42.16	-1.89	-8.088	-6.798
N+3.45	C16	ENVOLVENTE MIN	3.5	-211.5	-60.3	-42.16	-1.89	-48.519	-6.176
N+6.65	C17	ENVOLVENTE MAX	0	-55.45	-6.1	-17.29	1.044	-46.048	-30.571
N+6.65	C17	ENVOLVENTE MAX	1.6	-49.92	-6.1	-17.29	1.044	-8.356	-3.288
N+6.65	C17	ENVOLVENTE MAX	3.2	-44.39	-6.1	-17.29	1.044	47.732	52.586
N+6.65	C17	ENVOLVENTE MIN	0	-93.91	-40.19	-40.41	-1.142	-87.402	-76.742
N+6.65	C17	ENVOLVENTE MIN	1.6	-86.07	-40.19	-40.41	-1.142	-29.889	-29.954
N+6.65	C17	ENVOLVENTE MIN	3.2	-78.7	-40.19	-40.41	-1.142	6.338	-11.759
N+3.45	C17	ENVOLVENTE MAX	0	-254.91	27.31	11.01	1.813	41.715	74.212
N+3.45	C17	ENVOLVENTE MAX	1.75	-248.87	27.31	11.01	1.813	29.284	32.863
N+3.45	C17	ENVOLVENTE MAX	3.5	-242.82	27.31	11.01	1.813	121.69	128.147
N+3.45	C17	ENVOLVENTE MIN	0	-442.21	-72.01	-64.64	-1.89	-104.572	-123.912
N+3.45	C17	ENVOLVENTE MIN	1.75	-434.15	-72.01	-64.64	-1.89	1.714	-4.333
N+3.45	C17	ENVOLVENTE MIN	3.5	-426.08	-72.01	-64.64	-1.89	3.163	-21.387
N+6.65	C18	ENVOLVENTE MAX	0	-76.31	22.95	-7.88	1.044	-29.93	31.715
N+6.65	C18	ENVOLVENTE MAX	1.6	-70.78	22.95	-7.88	1.044	-7.632	8.796
N+6.65	C18	ENVOLVENTE MAX	3.2	-65.25	22.95	-7.88	1.044	29.552	39.753
N+6.65	C18	ENVOLVENTE MIN	0	-127.5	-19.92	-28.29	-1.142	-66.81	-24.133
N+6.65	C18	ENVOLVENTE MIN	1.6	-120.13	-19.92	-28.29	-1.142	-27.317	-6.065
N+6.65	C18	ENVOLVENTE MIN	3.2	-112.76	-19.92	-28.29	-1.142	-6.625	-41.872
N+3.45	C18	ENVOLVENTE MAX	0	-391.13	52.04	14.2	1.813	43.836	102.716
N+3.45	C18	ENVOLVENTE MAX	1.75	-385.08	52.04	14.2	1.813	24.787	11.867
N+3.45	C18	ENVOLVENTE MAX	3.5	-379.04	52.04	14.2	1.813	103.721	73.315
N+3.45	C18	ENVOLVENTE MIN	0	-683.86	-48.81	-56.55	-1.89	-94.227	-97.547
N+3.45	C18	ENVOLVENTE MIN	1.75	-675.8	-48.81	-56.55	-1.89	-1.062	-12.349
N+3.45	C18	ENVOLVENTE MIN	3.5	-667.74	-48.81	-56.55	-1.89	-5.879	-79.45
N+6.65	C19	ENVOLVENTE MAX	0	-73.79	23.98	-6.33	1.044	-28.699	29.746
N+6.65	C19	ENVOLVENTE MAX	1.6	-68.26	23.98	-6.33	1.044	-7.118	5.54
N+6.65	C19	ENVOLVENTE MAX	3.2	-62.73	23.98	-6.33	1.044	32.454	37.574
N+6.65	C19	ENVOLVENTE MIN	0	-124.81	-20.18	-30	-1.142	-67.477	-27.094
N+6.65	C19	ENVOLVENTE MIN	1.6	-117.44	-20.18	-30	-1.142	-28.555	-8.979
N+6.65	C19	ENVOLVENTE MIN	3.2	-110.06	-20.18	-30	-1.142	-9.995	-47.104
N+3.45	C19	ENVOLVENTE MAX	0	-386.76	50.19	18.89	1.813	53.969	100.416
N+3.45	C19	ENVOLVENTE MAX	1.75	-380.72	50.19	18.89	1.813	26.729	13.06
N+3.45	C19	ENVOLVENTE MAX	3.5	-374.67	50.19	18.89	1.813	111.649	79.342
N+3.45	C19	ENVOLVENTE MIN	0	-683.32	-51.3	-62.14	-1.89	-105.844	-100.207
N+3.45	C19	ENVOLVENTE MIN	1.75	-675.25	-51.3	-62.14	-1.89	-2.923	-10.919
N+3.45	C19	ENVOLVENTE MIN	3.5	-667.19	-51.3	-62.14	-1.89	-12.162	-75.269
N+6.65	C20	ENVOLVENTE MAX	0	-48.07	44.62	-4	1.044	-21.429	87.97



N+6.65	C20	ENVOLVENTE MAX	1.6	-42.54	44.62	-4	1.044	-0.465	34.133
N+6.65	C20	ENVOLVENTE MAX	3.2	-37.01	44.62	-4	1.044	37.13	4.643
N+6.65	C20	ENVOLVENTE MIN	0	-86.17	12.09	-27.01	-1.142	-51.825	42.156
N+6.65	C20	ENVOLVENTE MIN	1.6	-78.79	12.09	-27.01	-1.142	-23.172	5.265
N+6.65	C20	ENVOLVENTE MIN	3.2	-71.42	12.09	-27.01	-1.142	-11.15	-55.973
N+3.45	C20	ENVOLVENTE MAX	0	-208.64	76.4	29.33	1.813	72.859	130.595
N+3.45	C20	ENVOLVENTE MAX	1.75	-202.59	76.4	29.33	1.813	25.034	4.1
N+3.45	C20	ENVOLVENTE MAX	3.5	-196.54	76.4	29.33	1.813	102.818	12.271
N+3.45	C20	ENVOLVENTE MIN	0	-371.77	-22.89	-61.51	-1.89	-112.508	-67.862
N+3.45	C20	ENVOLVENTE MIN	1.75	-363.71	-22.89	-61.51	-1.89	-8.362	-35.02
N+3.45	C20	ENVOLVENTE MIN	3.5	-355.65	-22.89	-61.51	-1.89	-29.826	-136.843

9. VERIFICACIONES

VERIFICACIONES

VERIFICACIONES DE CORTANTE
PARA VIGAS
C.21.3.3.1 (a)
C.21.3.3.1 (b)

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO CLL 17 N°3N-102, IPIALES (NARIÑO)
RESISTENCIA A CORTANTE PARA VIGAS
CHEQUEO PARA LA CONDICIÓN DESCRITA EN C.21.3.3 (a)

$f'c = 21.1$ MPa
 $f_y = 420$ MPa
 $\Phi_{Cortante} = 0.75$
Estribos $\Phi = 9.5$ mm
 $A_v = 71$ mm²
 $R = 6.30$

M_n = Momentos nominales de la viga en cada extremo restringido de la luz libre.
 V_g = Cortante calculado para cargas gravitacionales mayoresadas.
 V_m = Cortante debido a flexion en curvatura inversa.
 $V_u = V_m + V_g$

COMDIS3 = 1.2C.M.+1.0C.V.+1.0Ex+0.3Ey
COMDIS4 = 1.2C.M.+1.0C.V.+1.0(-Ex)+0.3Ey
COMDIS5 = 1.2C.M.+1.0C.V.+1.0Ex+0.3(-Ey)
COMDIS6 = 1.2C.M.+1.0C.V.+1.0(-Ex)+0.3(-Ey)
COMDIS7 = 1.2C.M.+1.0C.V.+0.3Ex+1.0Ey
COMDIS8 = 1.2C.M.+1.0C.V.+0.3(-Ex)+1.0Ey

COMDIS9 = 1.2C.M.+1.0C.V.+0.3Ex+1.0(-Ey)
COMDIS10 = 1.2C.M.+1.0C.V.+0.3(-Ex)+1.0(-Ey)
COMDIS11 = 0.9C.M.+1.0Ex+0.3Ey
COMDIS12 = 0.9C.M.+1.0(-Ex)+0.3Ey
COMDIS13 = 0.9C.M.+1.0Ex+0.3(-Ey)
COMDIS14 = 0.9C.M.+1.0(-Ex)+0.3(-Ey)

COMDIS15 = 0.9C.M.+0.3Ex+1.0Ey
COMDIS16 = 0.9C.M.+0.3(-Ex)+1.0Ey
COMDIS17 = 0.9C.M.+0.3Ex+1.0(-Ey)
COMDIS18 = 0.9C.M.+0.3(-Ex)+1.0(-Ey)

NIVEL	VIGA ELEMENTO	LOC. (m)	LONG. (m)	PROPIEDADES DEL ELEMENTO			M3						Mn (kN.m)																	
				SECCION	b (m)	d (m)	C.M. (KN.M)	C.V. (KN.M)	SISMO X (KN.M)	SISMO Y (KN.M)	-SISMO X (KN.M)	-SISMO Y (KN.M)	Combinaciones para resistencias nominales a momento																	
													COMBDIS3	COMBDIS4	COMBDIS5	COMBDIS6	COMBDIS7	COMBDIS8	COMBDIS9	COMBDIS10	COMBDIS11	COMBDIS12	COMBDIS13	COMBDIS14	COMBDIS15	COMBDIS16	COMBDIS17	COMBDIS18		
N+3.45	B1	0.000	6.950	VIG30x45	0.30	0.40	-6.746	0.590	27.547	18.795	27.547	18.795	2.238	2.238	2.238	2.238	3.210	3.210	3.210	3.210	0.804	0.804	0.804	0.804	1.776	1.776	1.776	1.776	1.776	1.776
	B2	6.950					-10.001	0.231	27.567	18.780	27.567	18.780	6.500	6.500	6.500	6.500	7.477	7.477	7.477	7.477	3.731	3.731	3.731	3.731	4.707	4.707	4.707	4.707	4.707	4.707
N+6.65	B1	0.000	6.950	VIG30x45	0.30	0.40	-12.465	-0.641	16.423	7.303	-27.547	-18.795	12.644	19.624	13.887	20.867	13.658	15.752	17.800	19.894	8.264	15.243	9.507	16.486	9.277	11.371	13.420	15.514	17.563	19.612
	B2	6.950					-17.479	-1.547	16.748	7.302	-27.567	-18.780	19.516	26.550	20.758	27.792	20.565	22.675	24.705	26.815	12.725	19.759	13.967	21.001	13.775	15.885	17.915	20.025	22.135	24.245
N+3.45	B2	0.000	6.950	VIG30x45	0.30	0.40	-88.889	-17.928	30.024	13.590	16.423	7.303	119.182	121.341	119.481	121.640	121.008	121.656	122.006	122.654	74.587	76.746	74.887	77.046	76.413	77.061	77.411	78.059	78.707	79.355
	B3	6.950					-91.902	-17.781	30.753	12.409	-16.423	-7.303	122.591	130.079	123.530	131.018	124.629	126.876	127.758	130.005	77.239	84.728	78.178	85.666	79.278	81.524	82.407	84.653	85.536	87.782
N+6.65	B3	0.000	2.700	VIG30x45	0.30	0.40	-15.497	-2.906	16.138	3.945	-0.165	-0.038	18.753	21.341	18.943	21.530	20.108	20.884	20.740	21.516	11.198	13.786	11.388	13.975	12.553	13.329	13.185	13.961	14.737	15.513
	B3	2.700					3.973	1.129	3.645	0.684	30.024	13.590	6.508	10.695	7.122	11.309	6.179	7.435	8.227	9.483	4.187	8.374	4.801	8.989	3.858	5.114	5.906	7.163	7.949	8.735
N+3.45	B3	0.000	2.700	VIG30x45	0.30	0.40	-60.588	-13.223	36.594	9.573	0.623	1.132	79.664	85.374	80.066	85.776	82.667	84.379	84.006	85.719	48.265	53.974	48.667	54.376	51.267	52.980	52.607	54.320	55.033	56.746
	B4	2.700					-8.563	-3.471	8.192	1.458	30.753	12.409	12.377	8.796	11.855	8.274	13.125	12.051	11.387	10.312	6.337	2.756	5.815	2.234	7.085	6.011	5.947	4.273	2.600	0.887
N+6.65	B4	0.000	7.200	VIG30x45	0.30	0.40	-10.613	-1.765	16.543	4.289	-30.024	-13.590	11.670	19.062	12.522	19.913	13.032	15.250	15.870	18.087	6.722	14.113	7.573	14.965	8.083	10.301	10.921	13.139	13.761	15.979
	B4	7.200					-17.156	0.340	14.767	3.715	-0.838	-0.650	17.726	20.203	17.934	20.411	18.954	19.697	19.647	20.390	12.920	15.397	13.127	15.604	14.148	14.891	14.840	15.583	16.326	17.069
N+3.45	B4	0.000	7.200	VIG30x45	0.30	0.40	-28.977	-20.969	37.437	8.417	-30.753	-12.409	49.398	60.222	50.390	61.214	52.623	55.870	55.928	59.176	19.736	30.560	20.728	31.552	22.961	26.208	26.266	29.513	30.570	33.817
	B4	7.200					-41.743	-28.229	32.861	6.239	3.645	0.684	72.807	77.445	73.072	77.709	75.765	77.157	76.647	78.038	32.056	36.693	32.320	36.958	35.014	36.405	35.895	37.287	38.244	41.491
N+6.65	B5	0.000	7.075	VIG30x45	0.30	0.40	-11.809	0.207	13.380	3.470	-16.138	-3.945	11.675	16.360	12.028	16.713	12.776	14.181	13.953	15.358	8.339	13.024	8.692	13.378	9.440	10.846	10.617	12.023	12.799	14.195
	B5	7.075					-13.743	0.748	13.402	3.778	-3.645	-0.684	13.436	16.142	13.649	16.355	14.506	15.317	15.214	16.026	10.061	12.767	10.274	12.980	11.131	11.943	11.839	12.651	13.463	14.275
N+3.45	B5	0.000	7.075	VIG30x45	0.30	0.40	-29.196	-23.051	31.330	7.946	36.594	9.573	52.735	51.899	52.657	51.822	55.333	55.082	55.075	54.824	20.925	20.089	20.848	20.012	23.523	23.273	23.265	23.014	23.761	24.518
	B5	7.075					-42.771	-28.479	31.165	6.594	-36.594	-9.573	74.543	85.299	75.313	86.069	77.273	80.500	79.840	83.066	33.233	43.988	34.003	44.758	35.963	39.190	38.529	41.756	42.903	46.150
N+6.65	B6	0.000	7.325	VIG30x45	0.30	0.40	-19.347	-1.320	13.586	2.082	-14.203	-4.296	22.281	26.692	22.584	26.995	23.559	24.882	24.571	25.895	15.157	19.568	15.460	19.871	16.435	17.758	17.447	18.771	19.498	20.825
	B6	7.325					-18.918	-0.411	13.330	7.158	14.767	3.715	20.656	20.408	20.820	20.592	21.342	21.273	21.888	21.820	14.569	14.341	14.733	14.505	15.255	15.187	15.802	15.733	16.484	17.235
N+3.45	B6	0.000	7.325	VIG30x45	0.30	0.40	-78.055	-47.644	32.710	4.049	-16.543	-4.289	125.925	143.743	136.322	144.140	139.110	141.455	140.432	142.779	64.865	72.683	65.262	73.080	68.049	70.395	69.373	71.718	73.065	75.402
	B6	7.325					-144.586	-74.514	29.656	15.770	1.076	1.438	242.559	247.095	243.241	247.778	244.102	245.463	246.377	247.738	124.669	129.206	125.352	129.888	126.212	127.573	128.487	129.848	131.195	132.542
N+6.65	B7	0.000	6.950	VIG30x45	0.30	0.40	-9.955	2.625	15.745	3.573	32.861	6.239	6.652	3.935	6.525	3.808	8.004	7.189	7.581	6.766	6.290	3.573	6.163	3.446	7.643	6.828	7.219	6.404	5.589	4.774
	B7	6.950					-18.203	-3.661	17.536	4.362	-1.060	-1.447	22.513	25.465	22.790	25.742	23.977	24.863	24.899	25.785	13.391	16.343	13.668	16.620	14.855	15.741	15.777	16.663	17.548	18.434
N+6.65	B8	0.000	7.200	VIG30x45	0.30	0.40	-14.043	-2.491	17.106	3.437	-1.076	-1.438	16.464	19.350	16.696	19.582	17.982	18.848	18.756	19.622	9.760	12.646	9.992	12.878	11.279	12.144	12.052	12.918	13.783	14.648
	B8	7.200					-13.997	0.974	15.414	3.049	13.380	3.470	13.231	13.553	13.210	13.533	14.604	14.701	14.538	14.634	10.005	10.328	9.985	10.308	11.379	11.476	11.313	11.409	12.480	13.345
N+3.45	B8	0.000	7.200	VIG30x45	0.30	0.40	-69.895	-31.648	37.440	6.272	0.046	0.179	109.280	115.216	109.571	115.506	112.744	114.524	113.711	115.491	56.664	62.600	56.954	62.890	60.127	61.908	61.094	62.875	64.661	66.447
	B8	7.200					-98.907	-43.178	36.217	6.420	-0.046	-0.179	155.812	161.568	156.126	161.882	159.123	160.850	160.170	161.897	82.962	88.718	83.276	89.032	86.273	87.999	87.320	89.047	90.823	92.599
N+6.65	B9	0.000	7.075	VIG30x45	0.30	0.40	-12.594	0.271	14.604	2.911	-13.402	-3.778	12.385	16.830	12.704	17.149	13.684	15.018	14.746	16.080	8.878	13.323	9.196	13.642	10.177	11.511	11.239	12.572	13.300	14.027
	B9	7.075					-14.074	0.339	14.942	2.964	0.450	1.659	14.037	16.337	14.099	16.399	15.368	16.058	15.575	16.265	10.154	12.454	10.216	12.516	11.485	12.175	11.692	12.382	13.162	13.942
N+3.45	B9	0.000	7.075	VIG30x45	0.30	0.40	-96.500	-42.079	31.786	5.834	0.499	1.621	152.556	157.522	152.756	157.723	155.439	156.929	156.108	157.598	81.527	86.493	81.727	86.493	84.410	85.900	85.079	86.569	88.059	89.549
	B9	7.075					-106.069	-45.320	32.080	5.588	-0.499	-1.659	167.245	172.408	167.590	172.753	170.186	171.737	171.339	172.888	90.104	95.267	90.449	95.613	93.047	94.597	94.198	95.747	97.297	98.847
N+6.65	B10	0.000	7.325	VIG30x45	0.30	0.40	-14.088	-0.491	14.610	2.930	-0.499	-1.621	16.236	17.336	15.155	17.553	16.236	16.955	16.958	17.678	9.201	12.619	10.327	12.836	11.518	12.398	12.241	12.960	13.780	14.599
	B10	7.325					-15.085	0.151	14.465	2.917	12.586	2.082	15.516	15.656	15.556	15.695	16.799	16.941	16.922	16.974	11.142	11.281	11.181	11.321	12.425	12.467	12.557	12.599	13.639	14.679
N+3.45	B10	0.000	7.325	VIG30x45	0.30	0.40	-116.033	-52.441	31.920	5.396	0.904	1.827	186.661	191.604	186.851	191.774	189.628	191.505	190.195	191.672	99.349	104.272	99.519	104.442	102.296	103.773	102.863	104.340	105.811	107.281
	B10	7.325					-122.017	-53.671	30.605	5.646	13.30	7.158	194.865	197.707	194.893	197.635	197.738	198.160	197.498	198.320	104.689	107.431	104.617	107.359	107.462	108.284	107.222	108.044	109.111	110.181
N+6.65	B11	0.000	6.950	VIG30x45	0.30	0.40	-9.478	2.052	16.498	3.317	-13.586	-2.082	6.545	11.230	6.802	11.577	8.009	9.442	8.866	10.299	5.754	10.529	6.011	10.786	7.218	8.651	8.075	9.508	10.339	11.169
	B11	6.950					-18.377	-3.501	18.176	3.663	-4.578	-2.249	22.494	26.126	22.765	26.387	24.106	25.190	25.045	26.128	13.480	17.092	13.761	17.373	15.092	16.176	16.031	17.114	18.185	19.254
N+3.45	B11																													

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO CLL 17 N°3N-102, IPIALES (NARIÑO)
RESISTENCIA A CORTANTE PARA VIGAS
CHEQUEO PARA LA CONDICIÓN DESCRITA EN C.21.3.3 (a)

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO CLL 17 N°3N-102, IPIALES (NARIÑO)
RESISTENCIA A CORTANTE PARA VIGAS
CHEQUEO PARA LA CONDICIÓN DESCRITA EN C.21.3.3 (a)

$f_c = 21.1$ MPa
 $f_y = 420.0$ MPa
 $\Phi_{\text{Constante}} = 0.8$
Estribos $\Phi = 9.5$ mm
 $A_v = 71.0$ mm²
 $R = 6.3$

M_n = Momentos nominales de la viga en cada extremo restringido de la luz libre.
 V_g = Cortante calculado para cargas gravitacionales mayoradas.
 V_m = Cortante debido a flexion en curvatura inversa.
 $V_u = V_m + V_g$

$V_u = V_m + V_g$																$V_{u_{\max}}$	S	ΦV_s	ΦV_c	ΦV_n	$\Phi V_n > V_{u_{\max}}$
COMBDIS3	COMBDIS4	COMBDIS5	COMBDIS6	COMBDIS7	COMBDIS8	COMBDIS9	COMBDIS10	COMBDIS11	COMBDIS12	COMBDIS13	COMBDIS14	COMBDIS15	COMBDIS16	COMBDIS17	COMBDIS18	(kN)	(m)	(kN)	(kN)	(kN)	
(kN)																					
14.125	14.125	14.125	14.125	14.406	14.406	14.406	14.406	13.520	13.520	13.520	13.520	13.520	13.801	13.801	13.801	14.4	0.10	178.92	68.90	247.82	OK
14.156	14.156	14.156	14.156	14.156	14.156	14.156	14.156	14.156	14.156	14.156	14.156	14.156	14.156	14.156	14.156	19.4	0.10	178.92	68.90	247.82	OK
17.067	19.084	17.425	19.441	17.364	17.969	18.556	19.161	15.460	17.476	15.818	17.834	15.757	16.362	16.949	17.553	155.9	0.10	178.92	68.90	247.82	OK
14.584	14.584	14.584	14.584	14.584	14.584	14.584	14.584	14.584	14.584	14.584	14.584	14.584	14.584	14.584	14.584	28.5	0.10	178.92	68.90	247.82	OK
154.291	155.680	154.470	155.858	154.847	155.264	155.441	155.858	141.350	142.738	141.520	142.916	141.906	142.322	142.499	142.916	88.1	0.10	178.92	68.90	247.82	OK
120.544	120.544	120.544	120.544	120.544	120.544	120.544	120.544	120.544	120.544	120.544	120.544	120.544	120.544	120.544	120.544	17.459	0.10	178.92	68.90	247.82	OK
25.648	28.157	25.946	28.455	26.008	26.781	27.021	27.773	21.990	24.499	22.288	24.797	22.370	23.123	23.363	24.116	19.0	0.10	178.92	68.90	247.82	OK
5.792	5.792	5.792	5.792	5.792	5.792	5.792	5.792	5.792	5.792	5.792	5.792	5.792	5.792	5.792	5.792	75.126	0.10	178.92	68.90	247.82	OK
86.493	87.282	86.449	87.237	87.882	88.119	87.735	87.971	72.627	73.415	72.583	73.371	74.016	74.252	73.868	74.105	211.8	0.10	178.92	68.90	247.82	OK
5.384	5.384	5.384	5.384	5.384	5.384	5.384	5.384	5.384	5.384	5.384	5.384	5.384	5.384	5.384	5.384	16.308	0.10	178.92	68.90	247.82	OK
17.459	18.830	17.606	18.977	17.819	18.230	18.309	18.720	16.104	17.475	16.251	17.622	16.464	16.875	16.954	17.365	16.380	0.10	178.92	68.90	247.82	OK
14.620	14.620	14.620	14.620	14.620	14.620	14.620	14.620	14.620	14.620	14.620	14.620	14.620	14.620	14.620	14.620	18.378	0.10	178.92	68.90	247.82	OK
79.069	81.216	79.243	81.391	79.928	80.572	80.509	81.153	69.289	71.437	69.464	71.611	70.148	70.792	70.730	71.374	174.353	0.10	178.92	68.90	247.82	OK
69.508	69.508	69.508	69.508	69.508	69.508	69.508	69.508	69.508	69.508	69.508	69.508	69.508	69.508	69.508	69.508	133.804	0.10	178.92	68.90	247.82	OK
17.105	18.150	17.185	18.230	17.412	17.725	17.679	17.992	16.157	17.201	16.237	17.281	16.464	16.777	16.730	17.043	18.378	0.10	178.92	68.90	247.82	OK
13.948	13.948	13.948	13.948	13.948	13.948	13.948	13.948	13.948	13.948	13.948	13.948	13.948	13.948	13.948	13.948	18.378	0.10	178.92	68.90	247.82	OK
75.126	76.528	75.224	76.626	75.879	76.300	76.205	76.626	64.791	66.193	64.889	66.291	65.544	65.965	65.870	66.291	17.067	0.10	178.92	68.90	247.82	OK
64.220	64.220	64.220	64.220	64.220	64.220	64.220	64.220	64.220	64.220	64.220	64.220	64.220	64.220	64.220	64.220	18.378	0.10	178.92	68.90	247.82	OK
23.030	23.601	23.093	23.665	23.298	23.469	23.511	23.682	21.226	21.797	21.290	21.861	21.494	21.666	21.707	21.878	17.067	0.10	178.92	68.90	247.82	OK
18.208	18.208	18.208	18.208	18.208	18.208	18.208	18.208	18.208	18.208	18.208	18.208	18.208	18.208	18.208	18.208	211.8	0.10	178.92	68.90	247.82	OK
159.450	161.137	159.598	161.284	160.096	160.602	161.093	162.655	135.342	137.802	135.489	134.300	134.806	134.792	135.298	135.298	16.4	0.10	178.92	68.90	247.82	OK
211.848	211.848	211.848	211.848	211.848	211.848	211.848	211.848	211.848	211.848	211.848	211.848	211.848	211.848	211.848	211.848	19.5	0.10	178.92	68.90	247.82	OK
14.840	14.874	14.862	14.896	15.246	15.256	15.317	15.328	13.476	13.510	13.497	13.521	13.881	13.891	13.953	13.963	17.067	0.10	178.92	68.90	247.82	OK
16.380	16.380	16.380	16.380	16.380	16.380	16.380	16.380	16.380	16.380	16.380	16.380	16.380	16.380	16.380	16.380	17.067	0.10	178.92	68.90	247.82	OK
18.896	19.342	18.926	19.371	19.298	19.432	19.396	19.530	17.517	17.963	17.547	17.992	17.919	18.053	18.017	18.151	17.067	0.10	178.92	68.90	247.82	OK
13.224	13.224	13.224	13.224	13.224	13.224	13.224	13.224	13.224	13.224	13.224	13.224	13.224	13.224	13.224	13.224	17.067	0.10	178.92	68.90	247.82	OK
148.270	149.894	148.354	149.978	149.211	149.698	149.491	149.978	130.844	132.468	130.928	132.552	131.785	132.272	132.065	132.552	150.0	0.10	178.92	68.90	247.82	OK
127.252	127.252	127.252	127.252	127.252	127.252	127.252	127.252	127.252	127.252	127.252	127.252	127.252	127.252	127.252	127.252	18.3	0.10	178.92	68.90	247.82	OK
17.251	18.204	17.304	18.258	17.622	17.908	17.802	18.088	16.206	17.159	16.260	17.213	16.578	16.864	16.757	17.043	17.067	0.10	178.92	68.90	247.82	OK
13.988	13.988	13.988	13.988	13.988	13.988	13.988	13.988	13.988	13.988	13.988	13.988	13.988	13.988	13.988	13.988	175.9	0.10	178.92	68.90	247.82	OK
174.353	175.785	174.431	175.862	175.177	175.607	175.434	175.864	153.411	154.843	153.488	154.920	154.234	154.664	154.491	154.921	18.378	0.10	178.92	68.90	247.82	OK
133.804	133.804	133.804	133.804	133.804	133.804	133.804	133.804	133.804	133.804	133.804	133.804	133.804	133.804	133.804	133.804	17.067	0.10	178.92	68.90	247.82	OK
18.378	18.724	18.413	18.759	18.730	18.834	18.847	18.951	17.136	17.483	17.171	17.518	17.489	17.593	17.605	17.709	19.0	0.10	178.92	68.90	247.82	OK
14.256	14.256	14.256	14.256	14.256	14.256	14.256	14.256	14.256	14.256	14.256	14.256	14.256	14.256	14.256	14.256	202.658	0.10	178.92	68.90	247.82	OK
202.658	203.704	202.671	203.718	203.439	203.753	203.483	203.797	178.411	179.457	178.424	179.471	179.192	179.506	179.236	179.550	153.876	0.10	178.92	68.90	247.82	OK
153.876	153.876	153.876	153.876	153.876	153.876	153.876	153.876	153.876	153.876	153.876	153.876	153.876	153.876	153.876	153.876	14.874	0.10	178.92	68.90	247.82	OK
16.328	16.328	16.328	16.328	16.328	16.328	16.328	16.328	16.328	16.328	16.328	16.328	16.328	16.328	16.328	16.328	16.328	0.10	178.92	68.90	247.82	OK
178.441	180.130	178.529	180.218	179.421	179.928	179.716	180.222	159.266	160.955	159.354	161.043	160.246	160.753	160.541	161.047	180.2	0.10	178.92	68.90	247.82	OK
118.224	118.224	118.224	118.224	118.224	118.224	118.224	118.224	118.224	118.224	118.224	118.224	118.224	118.224	118.224	118.224						

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO CLL 17 N°3N-102, IPIALES (NARIÑO)
RESISTENCIA A CORTANTE PARA VIGAS
CHEQUEO PARA LA CONDICIÓN DESCRITA EN C.21.3.3 (a)

$f'c = 21.1$ MPa
 $f_y = 420$ MPa
 $\phi_{\text{Cortante}} = 0.75$
Estribos $\phi = 9.5$ mm
 $A_v = 71$ mm²
 $R = 6.30$

M_n = Momentos nominales de la viga en cada extremo restringido de la luz libre.
 V_g = Cortante calculado para cargas gravitacionales mayoresadas.
 V_m = Cortante debido a flexión en curvatura inversa.
 $V_u = V_m + V_g$

COMDIS3 = 1.2C.M.+1.0C.V.+1.0Ex+0.3Ey
COMDIS4 = 1.2C.M.+1.0C.V.+1.0(-Ex)+0.3Ey
COMDIS5 = 1.2C.M.+1.0C.V.+1.0Ex+0.3(-Ey)
COMDIS6 = 1.2C.M.+1.0C.V.+1.0(-Ex)+0.3(-Ey)
COMDIS7 = 1.2C.M.+1.0C.V.+0.3Ex+1.0Ey
COMDIS8 = 1.2C.M.+1.0C.V.+0.3(-Ex)+1.0Ey

COMDIS9 = 1.2C.M.+1.0C.V.+0.3Ex+1.0(-Ey)
COMDIS10 = 1.2C.M.+1.0C.V.+0.3(-Ex)+1.0(-Ey)
COMDIS11 = 0.9C.M.+1.0Ex+0.3Ey
COMDIS12 = 0.9C.M.+1.0(-Ex)+0.3Ey
COMDIS13 = 0.9C.M.+1.0Ex+0.3(-Ey)
COMDIS14 = 0.9C.M.+1.0(-Ex)+0.3(-Ey)

COMDIS15 = 0.9C.M.+0.3Ex+1.0Ey
COMDIS16 = 0.9C.M.+0.3(-Ex)+1.0Ey
COMDIS17 = 0.9C.M.+0.3Ex+1.0(-Ey)
COMDIS18 = 0.9C.M.+0.3(-Ex)+1.0(-Ey)

NIVEL	VIGA ELEMENTO No.	LOC. (m)	LONG. (m)	PROPIEDADES DEL ELEMENTO		M3						Mn (kN.m)																		
						SECCION	b (m)	d (m)	C.M. (kN.m)	C.V. (kN.m)	SISMO X (kN.m)	SISMO Y (kN.m)	-SISMO X (kN.m)	-SISMO Y (kN.m)	Combinaciones para resistencias nominales a momento															
															COMDIS3	COMDIS4	COMDIS5	COMDIS6	COMDIS7	COMDIS8	COMDIS9	COMDIS10	COMDIS11	COMDIS12	COMDIS13	COMDIS14	COMDIS15	COMDIS16	COMDIS17	COMDIS18
N+6.65	B12	0.000	7.200	VIG30K45	0.30	0.40	-22.416	-2.285	13.947	2.819	3.325	3.728	26.836	28.522	26.793	28.479	28.073	28.578	27.928	28.434	17.826	19.512	17.783	19.469	19.063	19.569	18.919	19.424		
	B12	7.200					-2.179	0.918	5.830	1.191	3.670	9.861	0.715	1.058	0.302	0.645	1.230	1.333	0.146	0.943	0.979	1.322	0.566	0.909	1.494	1.597	0.118	0.221		
N+3.45	B12	0.000	7.200	VIG30K45	0.30	0.40	-90.225	-15.970	34.514	5.838	29.656	15.770	118.484	119.255	118.011	118.782	121.670	121.901	120.093	120.325	75.446	76.217	74.973	75.744	76.632	78.864	77.056	77.287		
	B12	7.200					-66.392	-15.134	17.519	4.543	-3.325	-3.728	91.807	95.116	92.201	95.510	93.249	94.242	94.562	95.554	56.756	60.064	57.150	60.458	58.197	59.190	59.510	60.503		
N+6.65	B13	0.000	7.075	VIG30K45	0.30	0.40	-14.786	-1.499	19.349	3.399	-13.448	-6.641	16.009	21.215	16.487	21.693	17.781	19.343	19.343	20.937	10.074	15.280	10.552	15.758	11.846	13.408	13.440	15.002		
	B13	7.075					-13.770	0.605	17.976	3.153	-29.656	-15.770	12.916	20.476	13.817	21.377	14.563	16.831	17.566	19.834	9.390	16.950	10.291	17.851	11.037	13.305	14.040	16.308		
N+3.45	B13	0.000	7.075	VIG30K45	0.30	0.40	-89.914	-18.962	43.099	6.731	15.745	3.573	119.697	124.039	119.848	124.189	123.738	125.041	124.239	125.542	73.761	78.103	73.911	78.253	77.802	79.104	78.040	79.606		
	B13	7.075					-126.516	-26.574	39.396	8.060	-15.745	-3.573	171.756	180.599	172.310	181.063	175.238	177.864	177.084	179.710	107.227	115.980	107.781	116.534	110.709	113.335	112.556	115.181		
N+6.65	B14	0.000	7.325	VIG30K45	0.30	0.40	-13.079	0.139	16.268	2.837	-0.899	-0.413	12.838	15.563	12.993	15.718	14.331	15.148	14.847	15.664	9.054	11.779	9.209	11.933	10.546	11.364	11.062	11.879		
	B14	7.325					-14.611	0.244	16.247	2.825	17.106	3.437	14.576	14.439	14.547	14.410	16.067	16.026	15.970	15.929	10.436	10.300	10.407	10.271	11.928	11.887	11.831	11.790		
N+3.45	B14	0.000	7.325	VIG30K45	0.30	0.40	-121.119	-25.801	35.286	5.922	0.852	0.199	165.261	170.727	165.533	170.999	168.524	170.163	169.432	171.072	108.590	108.590	103.397	108.862	106.387	108.027	107.295	108.935		
	B14	7.325					-123.521	-25.861	34.258	7.368	-0.852	-0.199	168.298	173.871	168.658	174.231	171.285	172.957	172.486	174.158	105.380	110.953	105.741	111.314	108.368	110.040	109.569	111.241		
N+6.65	B15	0.000	6.950	VIG30K45	0.30	0.40	-10.428	0.901	18.503	3.263	-15.414	-3.049	8.520	13.904	8.821	14.204	10.214	11.829	11.215	11.676	6.593	11.977	7.986	9.601	8.988	10.603				
	B15	6.950					-18.188	-2.149	20.263	3.624	3.634	0.977	20.586	23.225	20.712	23.351	22.434	23.226	22.855	23.646	12.980	15.620	13.106	15.746	14.829	15.621	15.249	16.041		
N+3.45	B15	0.000	6.950	VIG30K45	0.30	0.40	-124.160	-26.702	41.984	7.266	3.976	0.900	168.684	174.717	168.987	175.020	172.541	174.351	173.552	175.362	104.734	110.767	105.037	111.070	108.591	110.401	109.602	111.412		
	B15	6.950					-87.276	-17.565	42.829	8.469	-3.674	-0.977	115.095	122.470	115.544	122.920	118.912	121.125	120.412	122.624	71.347	78.722	71.797	79.172	75.165	77.377	76.664	78.877		
N+3.45	B16	0.000	6.950	VIG30K45	0.30	0.40	-15.411	-2.622	12.818	6.169	-3.976	-0.900	18.789	21.455	19.123	21.789	19.533	20.333	20.648	21.447	11.544	14.209	11.878	14.544	12.288	13.087	13.402	14.202		
	B16	6.950					-16.739	-2.546	12.887	6.835	0.171	0.035	20.262	22.280	20.586	22.604	20.934	21.540	22.014	22.619	12.694	14.712	13.018	15.036	13.367	13.972	14.446	15.051		
N+6.65	B17	0.000	3.900	VIG30K45	0.30	0.40	-6.925	-1.853	11.320	15.876	14.942	2.964	7.610	7.035	8.225	7.650	7.104	6.931	9.153	8.981	3.680	3.105	3.270	3.173	3.001	5.223	5.051			
	B17	3.900					-5.636	-0.838	9.819	13.794	-0.171	-0.035	5.386	6.971	6.044	7.630	4.944	5.420	7.139	7.615	2.857	4.443	3.515	5.101	2.415	2.891	4.610	5.086		
N+3.45	B17	0.000	3.900	VIG30K45	0.30	0.40	-17.080	-2.467	35.582	48.323	-14.942	-2.964	15.014	23.034	17.456	25.476	13.598	16.004	21.739	24.145	7.423	15.443	9.865	6.007	8.413	14.148	16.554			
	B17	3.900					-18.129	-2.505	27.918	38.022	0.699	0.469	18.018	22.338	19.806	24.127	16.895	18.191	22.856	24.152	10.074	14.395	11.862	16.183	8.951	10.248	14.912	16.208		
N+6.65	B18	0.000	2.500	VIG30K45	0.30	0.40	-3.160	-0.914	11.389	15.983	0.186	0.426	2.137	3.915	2.878	4.656	1.627	2.160	4.096	4.630	0.275	2.053	1.016	2.794	0.235	0.298	2.234	2.768		
	B18	2.500					-2.417	-0.426	13.650	19.228	-31.786	-5.834	0.244	7.456	1.438	8.650	0.376	1.788	3.602	5.766	0.907	6.305	0.286	7.499	1.527	0.637	2.451	4.615		
N+3.45	B18	0.000	2.500	VIG30K45	0.30	0.40	-15.050	-3.332	34.617	47.249	-0.699	-0.469	13.647	19.253	15.920	21.525	12.244	13.925	19.818	21.500	5.800	11.406	8.073	13.678	4.397	6.078	11.971	13.653		
	B18	2.500					-0.343	0.074	43.031	58.863	-32.080	-5.588	9.296	2.627	5.696	11.055	7.478	0.825	2.752	9.325	2.598	6.256	5.667	11.084	7.507	0.853	2.723			
N+6.65	B19	0.000	7.000	VIG30K45	0.30	0.40	-40.310	-7.943	5.954	11.948	14.610	2.930	54.801	53.427	55.230	53.856	54.135	53.723	55.566	55.154	34.765	33.391	35.194	33.820	34.099	33.687	35.530	35.118		
	B19	7.000					-27.663	-6.937	3.623	9.885	-0.076	-0.023	39.087	39.674	39.559	40.146	38.391	38.567	39.964	40.140	23.851	24.438	24.323	24.910	23.155	23.331	24.728	24.904		
N+3.45	B19	0.000	7.000	VIG30K45	0.30	0.40	-143.197	-29.144	17.225	35.810	-14.465	-2.917	196.541	201.571	198.385	203.415	194.476	195.985	200.623	202.132	124.438	129.468	126.282	131.312	122.373	123.882	128.520	130.029		
	B19	7.000					-140.576	-31.607	8.410	25.463	-30.605	5.646	197.751	194.728	198.694	195.171	195.856	194.799	199.002	197.945	124.931	120.448	124.915	121.392	122.076	121.019	125.222	124.165		
N+6.65	B20	0.000	2.500	VIG30K45	0.30	0.40	-0.828	-1.444	7.277	17.543	-0.152	-5.396	0.447	6.669	1.539	7.761	0.694	1.173	2.948	4.814	1.245	4.976	0.153	6.069	2.386	0.519	1.255	3.122		
	B20	2.500					-16.973	-2.837	8.174	20.251	-0.198	-7.709	29.948	22.270	21.941	23.263	19.617	20.014	22.928	23.325	13.019	14.341	14.012	15.335	11.688	12.085	14.999	15.396		
N+3.45	B20	0.000	2.500	VIG30K45	0.30	0.40	-67.242	-17.085	21.934	51.465	-30.605	-5.646	91.843	100.183	94.563	102.902	88.562	91.064	97.627	100.129	54.585	62.925	57.305	65.645	51.304	53.806	60.370	62.871		
	B20	2.500					16.804	2.319	24.187	59.246	0.840	0.179	29.144	25.439	26.332	22.626	33.040	31.928	23.664	22.552	21.784	18.078	18.971	15.266	25.629	24.568	16.304	15.192		
N+6.65	B21	0.000	7.000	VIG30K45	0.30	0.40	-38.490	-10.982	2.798	12.343	-18.176	3.663	56.138	53.697	56.551	54.110	55.078	54.345	56.455	55.723	33.649	31.168	34.022	31.581	32.549	31.816	33.326	33.194		
	B21	7.000					-22.132	-8.706	2.324	10.643	-0.482	0.179	24.390	34.992	34.905	32.193	24.390	34.904	35.947	19.559	20.262	18.126	18.220	19.827	19.998					
N+3.45	B21	0.000	7.000	VIG30K45	0.30	0.40	-149.063	-38.637	6.316	34.228	-18.176	-3.663	214.880	218.768	216.684	220.572	211.779	212.945	217.793	218.960	131.524	135.412	133.329	137.216	128.423	129.589	134.437	135.604		
	B21	7.000					-135.674	-36.242	4.955	26.710	38.912	6.187	197.092	191.702	198.070	192.680	194.675	193.058	197.933	196.316	120.048	114.658	121.025	115.635	117.631	116.014	120.889	119.272		
N+6.65	B22	0.000	2.500	VIG30K45	0.30	0.40	1.593	-2.151	3.944	18.222	-35.369	-6.768	1.254	4.986	0.064	6.176	2.841	0.969	1.126	2.998	2.927	3.313	1.737	4.503	4.514	2.642	5.457	1.325		
	B22	2.500					-20.690	-2.912	4.285	19.594	-1.356	-1.436	26.122	27.022	27.128	28.024	24.426	24.694	27.764	28.033	17.008	17.903	18.009	18.965	15.307	15.715	18.645	18.914		
N+3.45	B22	0.000	2.500	VIG30K45	0.30	0.40	-66.399	-18.741	9.752	52.297	-38.912	-6.187	96.382	102.106	97.166	104.891	89.654	91.972	98.937	101.255	55.721	63.445	58.506	66.230	50.994	53.571</				

[illegible]

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO CLL 17 N°3N-102, IPIALES (NARIÑO)
RESISTENCIA A CORTANTE PARA VIGAS
CHEQUEO PARA LA CONDICIÓN DESCRITA EN C.21.3.3 (a)

$f'c = 21.1$ MPa
 $f_y = 420$ MPa
 $\phi_{cortante} = 0.75$
Estribos $\phi = 9.5$ mm
 $Av = 71$ mm²
 $R = 6.30$

M_n = Momentos nominales de la viga en cada extremo restringido de la luz libre.
 V_g = Cortante calculado para cargas gravitacionales mayoradas.
 V_m = Cortante debido a flexión en curvatura inversa.
 $V_u = V_m + V_g$

COMDIS3 = 1.2C.M.+1.0C.V.+1.0Ex+0.3Ey
COMDIS4 = 1.2C.M.+1.0C.V.+1.0(-Ex)+0.3Ey
COMDIS5 = 1.2C.M.+1.0C.V.+1.0Ex+0.3(-Ey)
COMDIS6 = 1.2C.M.+1.0C.V.+1.0(-Ex)+0.3(-Ey)
COMDIS7 = 1.2C.M.+1.0C.V.+0.3Ex+1.0Ey
COMDIS8 = 1.2C.M.+1.0C.V.+0.3(-Ex)+1.0Ey

COMDIS9 = 1.2C.M.+1.0C.V.+0.3Ex+1.0(-Ey)
COMDIS10 = 1.2C.M.+1.0C.V.+0.3(-Ex)+1.0(-Ey)
COMDIS11 = 0.9C.M.+1.0Ex+0.3Ey
COMDIS12 = 0.9C.M.+1.0(-Ex)+0.3Ey
COMDIS13 = 0.9C.M.+1.0Ex+0.3(-Ey)
COMDIS14 = 0.9C.M.+1.0(-Ex)+0.3(-Ey)

COMDIS15 = 0.9C.M.+0.3Ex+1.0Ey
COMDIS16 = 0.9C.M.+0.3(-Ex)+1.0Ey
COMDIS17 = 0.9C.M.+0.3Ex+1.0(-Ey)
COMDIS18 = 0.9C.M.+0.3(-Ex)+1.0(-Ey)

NIVEL	VIGA ELEMENTO	LOC. (m)	LONG. (m)	PROPIEDADES DEL ELEMENTO			M3						Mn (kN.m)																	
				SECCION	b (m)	d (m)	C.M. (KN.m)	C.V. (KN.m)	SISMO X (KN.m)	SISMO Y (KN.m)	-SISMO X (KN.m)	-SISMO Y (KN.m)	COMBDIS3	COMBDIS4	COMBDIS5	COMBDIS6	COMBDIS7	COMBDIS8	Combinaciones para resistencias nominales a momento											
																			COMBDIS9	COMBDIS10	COMBDIS11	COMBDIS12	COMBDIS13	COMBDIS14	COMBDIS15	COMBDIS16	COMBDIS17	COMBDIS18		
N+3.45	830	0.000	7.000	VIG30X45	0.30	0.40	-93.523	-17.698	15.201	33.376	-0.884	-0.187	125.923	128.477	127.522	130.075	123.904	124.670	129.231	129.997	80.169	82.722	81.767	84.320	78.149	78.915	83.477	84.242		
	830	7.000					-100.681	-17.712	19.489	34.799	3.164	3.734	133.779	136.370	135.258	137.849	132.078	132.855	137.008	137.786	85.862	88.454	87.342	89.933	84.161	84.939	89.092	89.870		
N+6.65	835	0.000	1.650	VIG30X45	0.30	0.40	-0.193	0.001	0.032	0.044	42.829	8.469	0.223	6.570	0.178	6.971	0.222	1.816	1.115	3.153	0.167	6.627	0.235	7.028	0.165	1.873	1.172	3.210		
	835	1.650					-17.028	-1.785	1.442	0.277	-4.746	-3.692	21.977	22.959	22.166	23.148	22.106	22.401	22.736	23.031	15.083	16.065	15.272	16.254	15.213	15.507	15.943	16.137		
N+3.45	835	0.000	1.650	VIG30X45	0.30	0.40	0.985	0.271	0.105	0.155	-3.164	-3.734	1.477	0.958	1.292	0.773	1.483	1.327	0.865	0.710	0.911	0.392	0.725	0.206	0.916	0.760	0.299	0.143		
	835	1.650					-37.564	-6.826	4.640	2.067	12.818	6.123	51.068	49.770	50.875	49.577	51.354	50.964	50.710	50.321	32.973	31.675	32.780	31.481	33.259	32.869	32.615	32.225		
N+6.65	836	0.000	1.650	VIG30X45	0.30	0.40	0.189	-0.002	0.049	0.011	0.379	0.708	0.233	0.285	0.266	0.319	0.229	0.245	0.340	0.355	0.178	0.231	0.212	0.264	0.174	0.190	0.285	0.301		
	836	1.650					-31.611	-3.350	0.551	0.099	12.887	6.835	41.191	39.233	40.870	38.912	41.241	40.654	40.172	39.585	28.358	26.400	28.037	26.079	28.408	27.821	27.339	26.751		
N+3.45	836	0.000	1.650	VIG30X45	0.30	0.40	3.601	0.798	0.050	0.270	-12.818	-6.123	5.140	3.097	4.836	2.793	5.164	4.552	4.150	3.537	3.262	1.219	2.957	0.915	3.286	2.673	2.271	1.659		
	836	1.650					-82.979	-16.861	1.710	3.593	-0.708	-0.417	115.993	116.377	116.184	116.568	115.784	115.899	116.421	116.536	74.239	74.622	74.430	74.813	74.029	74.144	74.666	74.781		
N+6.65	837	0.000	1.650	VIG30X45	0.30	0.40	0.187	0.001	0.046	0.011	-12.887	-6.835	0.233	1.820	0.093	2.146	0.229	0.387	0.857	1.473	0.176	1.877	0.150	2.203	0.172	0.444	0.914	1.530		
	837	1.650					-31.020	-3.224	0.636	0.124	0.768	1.055	40.341	40.320	40.297	40.276	40.398	40.392	40.250	40.244	27.811	27.790	27.767	27.746	27.868	27.862	27.720	27.714		
N+3.45	837	0.000	1.650	VIG30X45	0.30	0.40	3.483	0.770	0.122	0.303	9.819	13.794	4.983	6.523	5.626	7.165	5.004	5.465	7.145	7.607	3.168	4.708	3.811	5.350	3.189	3.650	5.330	5.792		
	837	1.650					-82.832	-16.872	0.902	4.194	-0.768	-1.055	115.928	116.193	116.177	116.443	115.562	115.641	116.395	116.474	74.206	74.471	74.456	74.721	73.840	73.920	74.673	74.753		
N+6.65	838	0.000	1.650	VIG30X45	0.30	0.40	-0.183	0.000	0.031	0.038	-9.819	-13.794	0.213	1.776	0.872	2.435	0.212	0.681	2.408	2.877	0.158	1.721	0.817	2.380	0.157	0.626	2.353	2.822		
	838	1.650					-17.080	-1.813	1.526	0.292	3.833	5.151	22.053	21.687	21.821	21.455	22.190	22.080	21.419	21.309	15.116	14.750	14.884	14.518	15.253	15.143	14.482	14.372		
N+3.45	838	0.000	1.650	VIG30X45	0.30	0.40	1.303	0.345	0.131	0.290	27.918	38.022	1.943	6.354	3.740	8.151	1.961	3.284	7.999	9.273	1.207	5.618	3.004	7.415	1.225	2.548	7.214	8.537		
	838	1.650					-34.963	-6.126	5.759	2.626	-3.833	-5.151	47.042	48.565	47.413	48.935	47.391	47.847	48.625	49.082	30.428	31.950	30.798	32.320	30.776	31.232	32.010	32.467		
N+6.65	941	0.000	6.950	VIG15X45	0.15	0.40	-4.367	-0.256	2.863	1.502	-27.918	-38.022	4.970	9.856	6.853	11.738	5.122	6.587	11.395	12.861	3.404	8.290	5.286	10.172	3.556	5.021	9.829	11.295		
	941	6.950					-5.379	-0.456	2.968	1.501	1.139	1.628	6.368	6.659	6.362	6.652	6.531	6.618	6.511	6.598	4.299	4.589	4.292	4.583	4.462	4.549	4.441	4.528		
N+6.65	942	0.000	1.620	VIG30X45	0.30	0.40	-16.225	-1.546	1.277	0.722	13.650	19.228	20.779	18.815	19.898	17.934	20.841	20.251	17.903	17.314	14.365	12.401	13.484	11.520	14.427	13.838	11.490	10.900		
	942	1.620					0.005	0.003	0.108	0.030	-1.139	-1.628	0.028	0.170	0.051	0.249	0.019	0.040	0.244	0.304	0.023	0.175	0.056	0.254	0.014	0.045	0.249	0.308		
N+6.65	943	0.000	1.620	VIG30X45	0.30	0.40	-16.706	-1.646	1.277	0.722	-13.650	-19.228	21.456	23.825	22.406	24.775	21.518	22.229	24.684	25.395	14.798	17.168	15.748	18.118	14.860	15.571	18.027	18.737		
	943	1.620					-0.005	-0.003	0.108	0.030	4.207	5.807	0.010	0.660	0.285	0.935	0.001	0.196	0.051	1.113	0.014	0.665	0.289	0.940	0.005	0.021	0.922	1.118		
N+6.65	850	0.000	2.220	VIG30X45	0.30	0.40	-26.325	-3.190	0.903	0.600	43.031	58.863	34.608	27.921	31.834	25.147	34.642	32.636	25.394	23.388	23.521	16.834	20.746	14.059	23.554	21.548	14.306	12.300		
	850	2.220					-0.118	-0.008	0.038	0.040	-4.207	-5.807	0.142	0.815	0.420	1.094	0.141	0.344	1.070	1.272	0.098	0.772	0.377	1.051	0.098	0.300	1.026	1.228		
N+6.65	851	0.000	2.220	VIG30X45	0.30	0.40	-35.743	-4.344	1.280	1.937	-43.031	-58.863	46.940	53.974	49.835	56.869	46.867	48.977	56.518	58.628	31.873	38.907	34.769	41.802	31.800	33.910	41.451	43.561		
	851	2.220					0.973	0.067	0.032	0.108	2.582	1.174	1.245	1.650	1.296	1.700	1.253	1.375	1.442	0.886	1.291	0.937	1.341	0.894	1.016	1.064	1.185			
N+3.45	862	0.000	7.000	VIG20X45	0.20	0.40	-21.173	-7.310	1.524	2.740	2.461	2.197	32.131	31.982	32.371	32.222	31.496	31.451	32.296	32.252	18.469	18.320	18.709	18.560	17.834	17.789	18.634	18.590		
	862	7.000					-45.886	-13.187	0.513	2.712	-2.582	-1.174	68.040	68.531	68.225	68.716	67.795	67.943	68.412	68.560	41.087	41.578	41.272	41.763	40.842	40.990	41.459	41.607		
N+3.45	863	0.000	2.500	VIG20X45	0.20	0.40	-41.785	-15.061	0.799	2.573	-2.461	-2.197	64.954	65.471	65.181	65.698	64.757	64.912	65.514	65.669	37.357	37.875	37.584	38.102	37.160	37.315	37.917	38.072		
	863	2.500					3.316	4.911	1.334	2.122	-3.623	-9.885	9.203	8.416	8.631	7.844	9.291	9.055	7.385	7.349	3.297	2.510	2.729	1.939	3.385	3.149	1.479	1.243		
N+3.45	8121	0.000	3.674	VIG40X45	0.40	0.40	-94.940	-22.572	7.516	30.611	17.225	35.810	133.849	132.308	133.602	137.061	131.283	130.821	130.458	129.996	82.795	81.254	82.548	81.007	80.229	79.767	79.404	78.942		
	8121	3.674					84.402	19.869	11.870	8.676	4.205	5.897	123.449	122.720	123.316	122.100	123.094	122.729	122.653	122.700	77.042	78.127	77.904	77.539	77.463	77.908				
N+3.45	8122	0.000	3.326	VIG40X45	0.40	0.40	80.394	16.218	13.628	29.965	-3.529	-2.694	-115.073	-113.470	-115.082	-113.479	-113.836	-113.255	-113.867	-113.386	-74.627	-72.034	-74.646	-72.043	-72.400	-72.919	-72.431	-72.950		
	8122	3.326					-101.272	-19.613	-19.117	-29.654	-17.225	-35.810	-136.679	-142.448	-139.811	-145.580	-135.474	-137.205	-145.914	-147.645	-85.648	-92.453	-89.816	-85.479	-87.210	-86.919	-87.650			
N+3.45	8123	0.000	1.500	VIG40X45	0.40	0.40	-66.347	-12.382	12.629	38.823	-5.390	-4.118	88.145	91.005	90.190	93.050	85.225	86.093	92.051	92.909	55.859	58.719	57.004	60.764	52.945	53.807	59.765	60.623		
	8123	1.500					4.437	0.246	4.378	28.034	-3.529	-2.694	7.219	5.964	6.137	4.882	8.959	8.582	5.351	4.975	5.642	4.387	4.560	3.305	7.382	7.005	3.774	3.398		
N+3.45	8124	0.000	4.830	VIG40X45	0.40	0.40	-3.120	-1.572	4.779	21.202	-8.410	-25.463	3.548	5.641	5.130	7.770	5.855	1.723	2.353	9.130	3.780	3.560	0.785	0.157	6.622	7.250				
	8124	4.830					-16.215	-11.014	13.985	45.905	0.483	1.307	8.956	11.099	11.080	13.223	5.410	6.052	12.489	13.132	4.788	6.931	6.911	9.055	1.241	1.884	8.320	8.963		
N+3.45	8125	0.000	1.500	VIG40X45	0.40	0.40	-66.706	-11.971	21.340	47.424	8.174	20.151	86.373	88.462	87.951	88.003	87.478	84.041	87.803	88.430	56.460	55.689	57.738	51.492	52.119	55.821	56.448			
	8125	1.500					4.622	0.525	12.094	21.352	-0.483	-1.307	9.008	7.011	7.929	5.932	10.037	9.438	6.440	5.841	7.096	5.100								

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO CLL 17 N°3N-102, IPIALES (NARIÑO)
RESISTENCIA A CORTANTE PARA VIGAS
CHEQUEO PARA LA CONDICIÓN DESCRITA EN C.21.3.3 (a)

$f_c = 21.1$ MPa
 $f_y = 420.0$ MPa
 $\Phi_{\text{Cortante}} = 0.8$
Estribos $\Phi = 9.5$ mm
 $A_v = 71.0$ mm²
 $R = 6.3$

M_n = Momentos nominales de la viga en cada extremo restringido de la luz libre.
 V_g = Cortante calculado para cargas gravitacionales mayoradas.
 V_m = Cortante debido a flexión en curvatura inversa.
 $V_u = V_m + V_g$

V _u	V _m = M _{nl} + M _{or} / l _n																
	COMBDIS3	COMBDIS4	COMBDIS5	COMBDIS6	COMBDIS7	COMBDIS8	COMBDIS9	COMBDIS10	COMBDIS11	COMBDIS12	COMBDIS13	COMBDIS14	COMBDIS15	COMBDIS16	COMBDIS17	COMBDIS18	
(kN)	(kN)																
111.14	37.100	37.835	37.540	38.275	36.569	36.789	38.034	38.255	23.719	24.454	24.158	24.893	23.187	23.408	24.653	24.873	
116.50																	
6.48	13.455	17.896	13.541	18.254	13.532	14.677	14.455	15.869	9.242	13.753	9.398	14.110	9.320	10.533	10.312	11.726	
21.47																	
27.06	31.845	30.744	31.616	30.515	32.022	31.692	31.258	30.927	20.535	19.434	20.306	19.205	20.712	20.382	19.948	19.617	
42.77																	
14.44	25.106	23.951	24.931	23.776	25.133	24.787	24.552	24.206	17.295	16.140	17.120	15.965	17.323	16.976	16.742	16.395	
38.32																	
68.66	73.414	72.409	73.345	72.340	73.302	73.001	73.073	72.771	46.970	45.965	46.901	45.896	46.858	46.556	46.629	46.327	
91.52																	
13.96	24.591	25.539	24.479	25.710	24.623	24.714	24.914	25.283	16.962	17.980	16.919	18.151	16.994	17.155	17.354	17.724	
37.69																	
68.45	73.279	74.373	73.820	74.914	73.070	73.398	74.873	75.201	46.894	47.987	47.434	48.528	46.684	47.012	48.487	48.815	
91.30																	
6.63	13.494	14.220	13.753	14.479	13.577	13.795	14.440	14.658	9.257	9.983	9.516	10.241	9.340	9.557	10.203	10.420	
21.47																	
24.79																	
40.50	29.688	33.284	31.002	34.598	29.910	30.989	34.288	35.367	19.173	22.768	20.486	24.082	19.394	20.473	23.772	24.851	
6.53																	
6.98	1.631	2.376	1.901	2.646	1.677	1.900	2.576	2.800	1.108	1.853	1.378	2.123	1.154	1.377	2.053	2.277	
20.56																	
6.53	12.844	11.719	12.314	11.224	12.876	12.526	11.202	10.875	8.882	7.763	8.358	7.268	8.915	8.570	7.246	6.919	
21.01																	
6.98	13.250	15.115	14.007	15.871	13.283	13.842	15.804	16.363	9.143	11.008	9.900	11.764	9.176	9.735	11.697	12.256	
26.16																	
6.77	15.653	12.944	14.529	11.820	15.668	14.856	11.920	11.108	10.639	7.930	9.515	6.806	10.654	9.842	6.906	6.094	
35.41																	
10.64	21.705	25.056	23.032	26.383	21.676	22.681	26.099	27.104	14.756	18.107	16.083	19.434	14.727	15.732	19.151	20.156	
55.82																	
75.92	14.310	14.359	14.371	14.420	14.184	14.199	14.387	14.402	8.508	8.557	8.569	8.618	8.382	8.397	8.585	8.599	
56.56																	
12.31	29.663	29.555	29.525	29.417	29.619	29.587	29.159	29.127	16.262	16.154	16.124	16.016	16.218	16.186	15.758	15.726	
120.76																	
33.35	70.032	69.281	69.929	69.178	69.237	69.012	68.892	68.667	43.836	43.086	43.733	42.982	43.041	42.816	42.697	42.471	
48.97																	
116.69	75.692	76.945	76.637	77.889	74.958	75.334	78.106	78.482	48.503	49.755	49.448	50.700	47.769	48.144	50.917	51.293	
76.04																	
63.26	63.576	64.646	64.218	65.288	62.796	63.117	64.935	65.256	41.001	42.071	41.642	42.713	40.220	40.541	42.359	42.680	
22.44																	
25.66	2.589	3.466	3.489	4.366	1.477	1.740	4.476	4.739	1.207	2.084	2.106	2.983	0.419	0.423	3.094	3.357	
77.24																	
63.55	63.587	63.649	63.733	63.796	62.341	62.359	62.829	62.848	40.991	41.053	41.137	41.200	39.744	39.763	40.233	40.251	
22.33																	
25.78	1.718	3.246	2.615	4.142	0.912	1.370	3.899	4.357	0.566	1.922	1.291	2.818	0.411	0.278	2.576	3.034	
82.44																	
87.67	27.356	27.580	27.372	27.596	27.475	27.542	27.529	27.596	16.549	16.773	16.566	16.789	16.669	16.736	16.722	16.789	
87.42																	
87.54	28.337	28.597	28.350	28.610	28.489	28.567	28.532	28.610	17.123	17.383	17.136	17.396	17.275	17.353	17.318	17.396	
88.51																	
69.45	20.901	21.336	20.886	21.321	21.168	21.299	21.120	21.251	12.443	12.878	12.428	12.863	12.710	12.840	12.662	12.793	
58.01																	
75.94	14.536	14.666	14.625	14.755	14.409	14.449	14.706	14.745	8.845	8.976	8.934	9.065	8.719	8.758	9.016	9.055	
29.14																	
15.12	19.903	20.381	20.624	21.102	19.774	19.917	22.177	22.320	12.049	12.528	12.770	13.248	11.920	12.064	14.323	14.467	
55.38																	
71.37	11.773	11.754	11.729	11.710	11.641	11.635	11.496	11.491	7.143	7.124	7.100	7.081	7.012	7.006	6.867	6.861	
39.49																	
50.11	6.554	6.845	6.801	7.092	6.523	6.611	7.346	7.433	4.516	4.342	4.276	4.566	4.520	4.468	4.821	4.908	
21.44																	
22.81	10.280	9.845	9.291	8.856	10.246	10.116	6.948	6.818	6.480	6.045	5.491	5.056	6.446	6.316	3.515	3.747	
6.77																	
6.98	1.291	1.585	1.680	1.974	1.306	1.394	2.602	2.690	0.995	1.289	1.384	1.678	1.010	1.098	2.306	2.394	
3.65																	
5.34	1.617	1.606	1.445	1.434	1.656	1.653	1.082	1.078	1.121	1.110	0.948	0.937	1.160	1.157	0.585	0.582	
6.48																	
7.27	1.884	2.072	1.957	2.144	1.963	2.020	2.204	2.260	1.348	1.536	1.421	1.608	1.427	1.484	1.668	1.724	

Mn = Momentos nominales de la viga en cada extremo restringido de la luz libre.
Vg = Cortante calculado para cargas gravitacionales mayoradas.
Vm = Cortante debido a flexión en curvatura inversa.
Vu = $V_m + V_g$

Vu = Vm + Vg																Vu _{max}	S	ΦVs	ΦVc	ΦVn	ΦVn > Vu _{max}	
COMBDIS3	COMBDIS4	COMBDIS5	COMBDIS6	COMBDIS7	COMBDIS8	COMBDIS9	COMBDIS10	COMBDIS11	COMBDIS12	COMBDIS13	COMBDIS14	COMBDIS15	COMBDIS16	COMBDIS17	COMBDIS18	(kN)	(m)	(kN)	(kN)	(kN)		
(MN)																						
148.236	148.971	148.676	149.411	147.705	147.925	149.170	149.391	134.855	135.590	135.294	136.029	134.323	134.544	135.789	136.009	14.9	0.10	178.92	68.90	247.82	OK	
116.500	116.500	116.500	116.500	116.500	116.500	116.500	116.500	116.500	116.500	116.500	116.500	116.500	116.500	116.500	116.500	24.7	0.10	178.92	68.90	247.82	OK	
19.935	24.376	20.021	24.734	20.012	21.157	20.935	22.349	15.722	20.233	15.878	20.590	15.800	17.013	16.792	18.206							
21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468							
58.901	57.800	58.672	57.571	59.078	58.748	58.314	57.983	47.591	46.467	47.362	46.261	47.768	47.438	47.004	46.673	59.1	0.10	178.92	68.90	247.82	OK	
42.768	42.768	42.768	42.768	42.768	42.768	42.768	42.768	42.768	42.768	42.768	42.768	42.768	42.768	42.768	42.768							
39.546	38.391	39.371	38.216	39.573	39.227	38.992	38.646	31.765	30.580	31.560	30.405	31.763	31.416	31.182	30.835	39.6	0.10	178.92	68.90	247.82	OK	
38.316	38.316	38.316	38.316	38.316	38.316	38.316	38.316	38.316	38.316	38.316	38.316	38.316	38.316	38.316	38.316							
142.070	141.065	145.001	140.996	141.958	141.657	141.729	141.626	115.616	114.611	115.557	114.552	115.514	115.212	115.285	114.983	142.1	0.10	178.92	68.90	247.82	OK	
91.524	91.524	91.524	91.524	91.524	91.524	91.524	91.524	91.524	91.524	91.524	91.524	91.524	91.524	91.524	91.524							
38.551	39.499	38.439	39.670	38.583	38.674	38.874	39.022	31.940	30.879	32.111	30.954	31.115	31.314	31.684		39.7	0.10	178.92	68.90	247.82	OK	
37.692	37.692	37.692	37.692	37.692	37.692	37.692	37.692	37.692	37.692	37.692	37.692	37.692	37.692	37.692	37.692							
141.727	142.821	142.268	143.362	141.518	141.846	143.321	143.649	115.342	115.882	116.976	115.132	116.460	116.935	117.263		143.6	0.10	178.92	68.90	247.82	OK	
91.304	91.304	91.304	91.304	91.304	91.304	91.304	91.304	91.304	91.304	91.304	91.304	91.304	91.304	91.304	91.304							
20.122	20.848	20.381	21.107	20.205	20.423	21.068	21.286	15.885	16.611	16.144	16.869	15.968	16.185	16.821	17.048							
21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468	21.468							
54.480	58.076	55.794	59.390	54.702	55.781	59.080	60.159	43.965	47.560	45.278	48.874	44.186	45.265	48.564	49.643							
40.504	40.504	40.504	40.504	40.504	40.504	40.504	40.504	40.504	40.504	40.504	40.504	40.504	40.504	40.504	40.504		60.2	0.10	178.92	68.90	247.82	OK
8.159	8.904	8.429	9.174	8.205	8.428	9.104	9.328	7.636	8.381	7.906	8.651	7.682	7.905	8.581	8.805		9.3	0.10	178.92	34.45	213.37	OK
6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984							
33.408	32.283	32.878	31.788	33.440	33.090	31.766	31.439	29.446	28.327	28.922	27.832	29.479	29.134	27.810	27.483		33.4	0.10	178.92	68.90	247.82	OK
6.528	6.528	6.528	6.528	6.528	6.528	6.528	6.528	6.528	6.528	6.528	6.528	6.528	6.528	6.528	6.528							
34.258	36.123	35.015	36.879	34.291	34.850	36.812	37.371	30.151	32.016	30.908	32.772	30.184	30.743	32.705	33.264		37.4	0.10	178.92	68.90	247.82	OK
6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984	6.984							
41.809	39.100	40.685	37.976	41.824	41.012	38.076	37.264	36.795	34.086	35.671	32.962	36.810	35.998	33.062	32.250		41.8	0.10	178.92	68.90	247.82	OK
6.768	6.768	6.768	6.768	6.768	6.768	6.768	6.768	6.768	6.768	6.768	6.768	6.768	6.768	6.768	6.768							
57.117	60.468	58.444	61.795	57.088	58.093	61.511	62.516	50.168	53.519	51.495	54.846	50.139	51.144	54.563	55.568		62.5	0.10	178.92	68.90	247.82	OK
10.636	10.636	10.636	10.636	10.636	10.636	10.636	10.636	10.636	10.636	10.636	10.636	10.636	10.636	10.636	10.636							
70.126	70.175	70.187	70.236	70.000	70.015	70.203	70.218	64.324	64.373	64.385	64.434	64.198	64.213	64.401	64.415		75.9	0.10	178.92	45.93	224.85	OK
75.924	75.924	75.924	75.924	75.924	75.924	75.924	75.924	75.924	75.924	75.924	75.924	75.924	75.924	75.924	75.924							
86.227	86.119	86.089	85.981	86.183	86.151	85.723	85.691	72.826	72.718	72.688	72.580	72.782	72.750	72.322	72.290		86.2	0.10	178.92	45.93	224.85	OK
12.312	12.312	12.312	12.312	12.312	12.312	12.312	12.312	12.312	12.312	12.312	12.312	12.312	12.312	12.312	12.312							
190.796	190.045	190.693	189.942	190.021	189.776	189.656	189.431	164.600	163.850	164.497	163.746	163.805	163.580	163.461	163.235		190.8	0.10	178.92	91.87	270.79	OK
33.352	33.352	33.352	33.352	33.352	33.352	33.352	33.352	33.352	33.352	33.352	33.352	33.352	33.352	33.352	33.352							
124.664	125.917	125.609	126.861	124.306	127.078	127.454	97.475	98.727	98.420	99.672	96.741	97.116	99.889	100.265		127.5	0.10	178.92	91.87	270.79	OK	
116.692	116.692	116.692	116.692	116.692	116.692	116.692	116.692	116.692	116.692	116.692	116.692	116.692	116.692	116.692	116.692							
140.512	141.582	141.154	142.224	139.732	140.053	141.871	142.192	117.937	119.007	118.578	117.699	117.156	117.477	119.295	119.616		142.2	0.10	178.92	91.87	270.79	OK
63.264	63.264	63.264	63.264	63.264	63.264	63.264	63.264	63.264	63.264	63.264	63.264	63.264	63.264	63.264	63.264							
25.029	25.906	25.929	26.806	23.917	24.180	26.916	27.179	23.647	24.524	24.546	25.423	22.859	22.863	25.534	25.797		27.2	0.10	178.92	91.87	270.79	OK
25.664	25.664	25.664	25.664	25.664	25.664	25.664	25.664	25.664	25.664	25.664	25.664	25.664	25.664	25.664	25.664							
140.885	140.885	140.969	141.032	139.577	139.595	140.065	140.084	118.227	118.289	118.373	118.634	116.980	116.999	117.469	117.487		141.0	0.10	178.92	91.87	270.79	OK
63.552	63.552	63.552	63.552	63.552	63.552	63.552	63.552	63.552	63.552	63.552	63.552	63.552	63.552	63.552	63.552							
24.050	25.578	24.947	26.474	23.244	23.702	26.261	26.339	22.888	24.254	23.623	25.150	22.743	22.610	24.908	25.366		26.7	0.10	178.92	91.87	270.79	OK
25.776	25.776	25.776	25.776	25.776	25.776	25.776	25.776	25.776	25.776	25.776	25.776	25.776	25.776	25.776	25.776							
109.800	110.024	109.816	110.040	109.919	109.986	109.973	110.040	98.993	99.217	99.010	99.233	99.113	99.180	99.166	99.233		110.0	0.10	178.92	45.93	224.85	OK
87.672	87.672	87.672	87.672	87.672	87.672	87.672	87.672	87.672	87.672	87.672	87.672	87.672	87.672	87.672	87.672							
115.757	116.017	115.770	116.030	115.909	115.987	115.952	116.030	104.543	104.803	104.556	104.816	104.695	104.773	104.738	104.816		116.0	0.10	178.92	45.93	224.85	OK
87.536	87.536	87.536	87.536	87.536	87.536	87.536	87.536	87.536	87.536	87.536	87.536	87.536	87.536	87.536	87.536							
109.413	109.848	109.398	109.833	109.680	109.811	109.632	109.763	100.955	101.390	100.940	101.375	101.222	101.352	101.174	101.305							
69.452	69.452	69.452	69.452	69.452	69.452	69.452	69.452	69.452	69.452	69.452	69.452	69.452	69.452	69.452	69.452		109.8	0.10	178.92	45.93	224.85	OK
72.544	72.674	72.623	72.724	72.417	72.457	72.714	72.753	66.853	66.984	66.942	67.073	66.727	66.766	67.024	67.063		75.9	0.10	178.92	45.93	224.85	OK
75.944	75.944	75.944	75.944	75.944	75.944	75.944	75.944	75.944	75.944	75.944	75.944	75.944	75.944	75.944	75.944							
49.039	49.517	49.760	50.238	48.910	49.053	51.313	51.456	41.185	41.664	41.906	42.384	41.056	41.200	43.459	43.603		51.5	0.10	178.92	45.93	224.85	OK
15.116	15.116	15.116	15.116	15.116	15.116	15.116	15.116	15.116	15.116	15.116	15.116	15.116	15.116	15.116	15.116							
67.153	67.134	67.109	67.090	67.021	67.015																	

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO CLL 17 N°3N-102, IPIALES (NARIÑO)
RESISTENCIA A CORTANTE PARA VIGAS
CHEQUEO PARA LA CONDICIÓN DESCRITA EN C.21.3.3 (a)

$f'c = 21.1$ MPa
 $f_y = 420$ MPa
 $\Phi_{\text{Cortante}} = 0.75$
Estribos $\Phi = 9.5$ mm
 $A_v = 71$ mm²
 $R = 6.30$

M_n = Momentos nominales de la viga en cada extremo restringido de la luz libre.
 V_g = Cortante calculado para cargas gravitacionales mayoradas.
 V_m = Cortante debido a flexión en curvatura inversa.
 $V_u = V_m + V_g$

COMDIS3 = 1.2C.M.+1.0C.V.+1.0Ex+0.3Ey
COMDIS4 = 1.2C.M.+1.0C.V.+1.0(-Ex)+0.3Ey
COMDIS5 = 1.2C.M.+1.0C.V.+1.0Ex+0.3(-Ey)
COMDIS6 = 1.2C.M.+1.0C.V.+1.0(-Ex)+0.3(-Ey)
COMDIS7 = 1.2C.M.+1.0C.V.+0.3Ex+1.0Ey
COMDIS8 = 1.2C.M.+1.0C.V.+0.3(-Ex)+1.0Ey

COMDIS9 = 1.2C.M.+1.0C.V.+0.3Ex+1.0(-Ey)
COMDIS10 = 1.2C.M.+1.0C.V.+0.3(-Ex)+1.0(-Ey)
COMDIS11 = 0.9C.M.+1.0Ex+0.3Ey
COMDIS12 = 0.9C.M.+1.0(-Ex)+0.3Ey
COMDIS13 = 0.9C.M.+1.0Ex+0.3(-Ey)
COMDIS14 = 0.9C.M.+1.0(-Ex)+0.3(-Ey)

COMDIS15 = 0.9C.M.+0.3Ex+1.0Ey
COMDIS16 = 0.9C.M.+0.3(-Ex)+1.0Ey
COMDIS17 = 0.9C.M.+0.3Ex+1.0(-Ey)
COMDIS18 = 0.9C.M.+0.3(-Ex)+1.0(-Ey)

NIVEL	VIGA ELEMENTO No.	LOC. (m)	LONG. (m)	PROPIEDADES DEL ELEMENTO			M3						Mn (kN.m)																	
				SECCION	b (m)	d (m)	C.M. (kN.m)	C.V. (kN.m)	SISMO X (kN.m)	SISMO Y (kN.m)	-SISMO X (kN.m)	-SISMO Y (kN.m)	Combinaciones para resistencias nominales a momento																	
													COMBDIS3	COMBDIS4	COMBDIS5	COMBDIS6	COMBDIS7	COMBDIS8	COMBDIS9	COMBDIS10	COMBDIS11	COMBDIS12	COMBDIS13	COMBDIS14	COMBDIS15	COMBDIS16	COMBDIS17	COMBDIS18		
N+3.45	B224	0.000	7.075	VIG15X45	0.15	0.40	-10.658	-1.864	11.392	2.663	-1.476	-6.228	12.719	14.761	13.142	15.184	13.688	14.301	15.100	15.712	7.657	9.700	8.081	10.123	8.627	9.240	10.038	10.651		
	B224	7.075					-30.044	-6.143	8.218	2.339	3.364	16.395	40.780	41.550	40.111	40.881	41.433	41.664	39.202	39.433	25.624	26.394	24.954	25.725	26.277	26.508	24.046	24.277		
N+6.65	B225	0.000	7.325	VIG15X45	0.15	0.40	-7.022	0.064	1.864	0.344	7.372	38.675	8.050	7.176	6.225	5.351	8.219	7.957	2.125	1.872	6.008	5.133	4.182	3.308	6.176	5.914	0.092	0.170		
	B225	7.325					-6.872	0.142	1.838	0.338	-3.364	-16.395	7.797	8.622	8.593	9.419	7.963	8.211	10.619	10.867	5.877	6.703	6.674	7.499	6.044	6.291	8.700	8.947		
N+3.45	B225	0.000	7.325	VIG15X45	0.15	0.40	-28.606	-5.829	6.235	2.490	-7.372	-38.675	39.048	41.208	41.008	43.168	39.464	40.112	45.998	46.646	24.637	26.797	26.597	28.757	25.053	25.701	31.587	32.235		
	B225	7.325					-29.166	-5.889	6.712	2.497	4.281	12.769	39.704	40.090	39.215	39.601	40.172	40.288	38.542	38.658	25.065	25.451	24.576	24.962	25.533	25.649	23.903	24.019		
N+6.65	B226	0.000	6.950	VIG15X45	0.15	0.40	-6.656	0.154	2.582	0.475	-5.160	-14.909	7.401	8.630	8.133	9.362	7.635	8.004	10.077	10.445	5.558	6.787	6.291	7.519	5.792	6.161	8.234	8.603		
	B226	6.950					-5.025	-0.507	3.800	0.704	-4.281	-12.769	5.900	7.183	6.542	7.825	6.244	6.629	8.383	8.768	3.886	5.169	4.527	5.810	4.230	4.615	6.368	6.753		
N+3.45	B226	0.000	6.950	VIG15X45	0.15	0.40	-29.809	-6.245	7.671	2.754	13.606	39.425	40.667	39.725	38.921	37.979	41.213	40.931	35.393	35.110	25.479	24.537	23.733	22.791	26.026	25.743	20.205	19.922		
	B226	6.950					-7.564	-0.929	12.548	2.828	0.729	3.849	7.879	9.755	7.831	9.707	8.959	9.522	8.797	9.360	4.681	6.557	4.633	6.509	5.761	6.324	5.599	6.162		
N+3.45	B227	0.000	1.650	VIG20X45	0.20	0.40	-2.770	-0.654	0.152	0.289	9.317	31.398	3.940	2.485	2.459	1.004	3.925	3.488	1.013	1.449	2.455	1.000	0.974	0.481	2.440	2.003	2.498	2.934		
	B227	1.650					-9.207	-3.747	0.916	3.530	-1.523	-6.978	14.482	14.869	14.982	15.369	14.191	14.308	15.859	15.976	7.973	8.360	8.473	8.860	7.682	7.799	9.350	9.466		
N+3.45	B228	0.000	1.650	VIG20X45	0.20	0.40	-3.630	-0.832	0.057	0.284	-1.811	-7.877	5.165	5.462	5.554	5.851	5.140	5.229	6.436	6.525	3.244	3.541	3.633	3.930	3.219	3.308	4.515	4.604		
	B228	1.650					-8.203	-3.570	0.801	3.754	-9.317	-31.398	13.108	14.714	14.782	16.388	12.780	13.611	18.359	18.841	7.077	8.683	8.751	10.357	6.749	7.230	12.328	12.810		
N+3.45	B229	0.000	1.650	VIG20X45	0.20	0.40	-2.972	-0.698	0.099	0.385	7.142	21.272	4.230	3.112	3.236	2.118	4.199	3.863	0.883	0.548	2.641	1.523	1.646	0.528	2.609	2.274	0.706	1.042		
	B229	1.650					-10.830	-4.123	2.275	4.560	8.028	19.695	16.541	15.628	15.820	14.907	16.287	16.013	13.884	13.611	9.169	8.256	8.448	7.535	8.915	8.641	6.512	6.239		
N+3.45	B240	0.000	3.475	VIG30X45	0.30	0.40	-106.447	-49.665	32.336	5.553	-7.142	-21.272	172.004	178.271	173.282	179.548	174.980	176.860	179.238	181.118	90.405	96.672	91.683	97.949	93.381	95.261	97.639	99.519		
	B240	3.475					72.799	28.086	1.172	0.498	-8.028	-19.695	115.655	114.194	114.693	113.233	115.580	115.142	112.374	111.936	65.729	64.269	64.767	63.307	65.654	65.216	62.449	62.011		
N+3.45	B241	0.000	3.475	VIG30X45	0.30	0.40	72.503	27.833	0.801	0.425	19.118	57.197	114.984	117.891	117.687	120.595	114.942	115.814	123.954	124.826	65.400	68.308	68.104	71.011	65.358	66.231	74.370	75.242		
	B241	3.475					-71.977	-29.826	36.530	7.404	21.580	57.344	110.047	112.420	107.669	110.042	113.284	113.996	105.357	106.069	58.628	61.001	56.250	58.623	61.865	62.576	53.938	54.649		
N+3.45	B242	0.000	2.500	VIG20X45	0.20	0.40	-38.936	-9.420	0.161	0.522	-19.118	-57.197	56.093	59.153	58.841	61.901	56.053	56.971	65.214	66.132	34.992	38.052	37.741	40.801	34.952	35.870	44.114	45.032		
	B242	2.500					-38.437	-9.844	1.258	1.538	-21.580	-57.344	55.695	59.321	58.499	62.124	55.664	56.752	65.011	66.098	34.320	37.945	37.124	40.749	34.289	35.377	43.636	44.723		
N+3.45	B245	0.000	1.500	VIG20X45	0.20	0.40	-10.576	-3.176	0.740	1.734	4.722	14.780	15.667	15.035	15.046	14.414	15.557	15.367	13.486	13.296	9.318	8.686	8.697	8.065	9.208	9.018	7.137	6.948		
	B245	1.500					-15.137	-3.659	1.010	2.550	6.577	5.654	21.542	20.658	21.394	20.510	21.371	21.105	20.878	20.613	13.342	12.458	13.194	12.310	13.170	12.905	12.678	12.413		
N+3.45	B246	0.000	3.475	VIG30X45	0.30	0.40	-40.731	-13.265	7.826	3.341	7.091	2.331	60.741	60.858	60.789	60.906	61.239	61.274	61.400	61.435	35.257	35.373	35.305	35.421	35.755	35.790	35.915	35.950		
	B246	3.475					60.878	17.468	2.162	1.184	-4.722	-14.780	90.921	89.828	90.161	89.068	90.812	90.485	88.279	87.951	55.190	54.097	54.430	53.337	55.081	54.753	52.547	52.219		
N+3.45	B247	0.000	3.475	VIG30X45	0.30	0.40	61.010	17.640	2.945	1.424	-6.082	-4.696	91.387	89.954	91.096	89.663	91.218	90.788	90.247	89.817	55.444	54.011	55.153	53.720	55.275	54.845	54.304	53.874		
	B247	3.475					-30.189	-8.188	11.467	3.347	-7.091	-2.331	42.435	45.381	42.706	45.651	43.337	44.221	44.239	45.122	25.191	28.136	25.461	28.407	26.093	26.976	26.994	27.878		
N+3.45	B248	0.000	7.000	VIG20X45	0.20	0.40	-47.389	-10.734	0.945	3.593	-10.201	-16.897	67.280	69.049	68.255	70.025	66.985	67.516	70.238	70.769	42.329	44.098	43.305	45.074	42.035	42.566	45.287	45.818		
	B248	7.000					-23.772	-6.951	1.253	3.492	-7.958	-17.486	35.112	36.574	36.111	37.573	34.863	35.302	38.193	38.632	21.030	22.492	22.029	23.491	20.781	21.219	24.111	24.549		

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO CLL 17 N°3N-102, IPIALES (NARIÑO)
RESISTENCIA A CORTANTE PARA VIGAS
CHEQUEO PARA LA CONDICIÓN DESCRITA EN C.21.3.3 (a)

f'_c = 21.1 MPa
 f_y = 420.0 MPa
 Φ_{Cortante} = 0.8
Estribos Φ = 9.5 mm
 A_v = 71.0 mm²
R = 6.3

M_n = Momentos nominales de la viga en cada extremo restringido de la luz libre.
 V_g = Cortante calculado para cargas gravitacionales mayoradas.
 V_m = Cortante debido a flexion en curvatura inversa.
 V_u = $V_m + V_g$

Vu = Vm + Vg																Vu,max	S	ΦVs	ΦVc	ΦVn	ΦVn > Vu,max
COMBDIS3	COMBDIS4	COMBDIS5	COMBDIS6	COMBDIS7	COMBDIS8	COMBDIS9	COMBDIS10	COMBDIS11	COMBDIS12	COMBDIS13	COMBDIS14	COMBDIS15	COMBDIS16	COMBDIS17	COMBDIS18	(kN)	(m)	(kN)	(kN)	(kN)	
(kN)																					
34.618	35.015	34.583	34.980	34.847	34.966	34.731	34.850	31.760	32.158	31.725	32.123	31.989	32.109	31.874	31.993	35.4	0.10	178.92	34.45	213.37	OK
35.372	35.372	35.372	35.372	35.372	35.372	35.372	35.372	35.372	35.372	35.372	35.372	35.372	35.372	35.372	35.372						
9.319	9.313	9.179	9.172	9.365	9.363	8.897	8.895	8.778	8.772	8.638	8.631	8.824	8.822	8.356	8.401	9.4	0.10	178.92	34.45	213.37	OK
7.076	7.076	7.076	7.076	7.076	7.076	7.076	7.076	7.076	7.076	7.076	7.076	7.076	7.076	7.076	7.076						
44.035	44.383	44.236	44.583	44.156	44.260	44.825	44.930	40.069	40.417	40.270	40.618	40.190	40.294	40.859	40.964	44.9	0.10	178.92	34.45	213.37	OK
33.496	33.496	33.496	33.496	33.496	33.496	33.496	33.496	33.496	33.496	33.496	33.496	33.496	33.496	33.496	33.496						
8.786	9.147	8.984	9.345	8.869	8.977	9.528	9.528	8.231	8.592	8.429	8.790	8.314	8.422	8.973	9.081	9.6	0.10	178.92	34.45	213.37	OK
6.628	6.628	6.628	6.628	6.628	6.628	6.628	6.628	6.628	6.628	6.628	6.628	6.628	6.628	6.628	6.628						
41.937	42.071	41.679	41.813	42.171	42.211	41.310	41.351	39.292	39.426	39.033	39.168	39.526	39.566	38.665	38.705	42.2	0.10	178.92	34.45	213.37	OK
24.792	24.792	24.792	24.792	24.792	24.792	24.792	24.792	24.792	24.792	24.792	24.792	24.792	24.792	24.792	24.792						
12.785	12.138	12.190	11.543	12.600	12.405	11.846	12.181	7.940	7.293	7.345	7.281	7.755	7.561	8.801	9.136	17.0	0.10	178.92	45.93	224.85	OK
16.980	16.980	16.980	16.980	16.980	16.980	16.980	16.980	16.980	16.980	16.980	16.980	16.980	16.980	16.980	16.980						
14.387	15.540	15.637	16.790	14.172	14.518	18.339	18.685	9.567	10.720	10.817	11.970	9.353	9.699	13.520	13.866	18.7	0.10	178.92	45.93	224.85	OK
15.272	15.272	15.272	15.272	15.272	15.272	15.272	15.272	15.272	15.272	15.272	15.272	15.272	15.272	15.272	15.272						
12.857	11.626	11.817	10.586	12.683	12.314	9.218	8.849	7.425	6.194	6.386	5.155	7.252	6.883	4.643	4.680	18.7	0.10	178.92	45.93	224.85	OK
18.332	18.332	18.332	18.332	18.332	18.332	18.332	18.332	18.332	18.332	18.332	18.332	18.332	18.332	18.332	18.332	18.3	0.10	178.92	45.93	224.85	OK
219.920	221.303	220.010	221.393	220.754	221.169	221.057	221.472	182.071	183.454	182.162	183.545	182.905	183.320	183.208	183.623	221.5	0.10	178.92	68.90	247.82	OK
58.252	58.252	58.252	58.252	58.252	58.252	58.252	58.252	58.252	58.252	58.252	58.252	58.252	58.252	58.252	58.252	221.5	0.10	178.92	68.90	247.82	OK
101.761	103.281	101.855	103.374	102.681	103.136	102.993	103.448	72.696	74.215	72.789	74.309	73.615	74.071	73.927	74.383	115.9	0.10	178.92	68.90	247.82	OK
115.876	115.876	115.876	115.876	115.876	115.876	115.876	115.876	115.876	115.876	115.876	115.876	115.876	115.876	115.876	115.876						
66.803	69.477	69.024	71.698	66.775	67.577	74.178	74.980	49.813	52.487	52.034	54.708	49.784	50.587	57.188	57.990	75.0	0.10	178.92	45.93	224.85	OK
22.164	22.164	22.164	22.164	22.164	22.164	22.164	22.164	22.164	22.164	22.164	22.164	22.164	22.164	22.164	22.164						
28.498	27.487	27.985	26.975	28.310	28.007	26.601	26.298	18.799	17.788	18.286	17.275	18.611	18.308	16.902	16.599	28.5	0.10	178.92	45.93	224.85	OK
12.028	12.028	12.028	12.028	12.028	12.028	12.028	12.028	12.028	12.028	12.028	12.028	12.028	12.028	12.028	12.028						
131.364	131.083	131.159	130.878	131.476	131.392	130.793	130.709	113.748	113.467	113.543	113.262	113.860	113.776	113.177	113.093	131.5	0.10	178.92	68.90	247.82	OK
10.760	10.760	10.760	10.760	10.760	10.760	10.760	10.760	10.760	10.760	10.760	10.760	10.760	10.760	10.760	10.760						
43.426	43.861	43.420	43.855	43.637	43.768	43.617	43.747	28.120	28.556	28.114	28.550	28.331	28.462	28.311	28.442	81.8	0.10	178.92	68.90	247.82	OK
81.848	81.848	81.848	81.848	81.848	81.848	81.848	81.848	81.848	81.848	81.848	81.848	81.848	81.848	81.848	81.848						
87.719	88.181	88.002	88.463	87.642	87.780	88.582	88.721	82.143	82.605	82.425	82.887	82.066	82.204	83.006	83.144	88.7	0.10	178.92	45.93	224.85	OK
58.296	58.296	58.296	58.296	58.296	58.296	58.296	58.296	58.296	58.296	58.296	58.296	58.296	58.296	58.296	58.296						

ZVE = Cortante máximo obtenido de las combinaciones de carga de diseño que incluyan E , considerando E como el doble del prescrito por el reglamento general legalmente adoptado para diseño sísmico vial.

OMDIS9 = 1.2C.M. + 1.0C.V. + (2*(0.3Ex)) + (2*(1.0(-Ey)))
 OMDIS10 = 1.2C.M. + 1.0C.V. + (2*(0.3(-Ex))) + (2*(1.0(-Ey)))
 OMDIS11 = 0.9C.M. + (2*(1.0Ex)) + (2*(0.3Ey))
 OMDIS12 = 0.9C.M. + (2*(1.0(-Ex))) + (2*(0.3Ey))
 OMDIS13 = 0.9C.M. + (2*(1.0Ex)) + (2*(0.3(-Ey)))
 OMDIS14 = 0.9C.M. + (2*(1.0(-Ex))) + (2*(0.3(-Ey)))

[illegible]

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO CIL 17 N°3N-102, IPAALES (NARIÑO)
RESISTENCIA A CORTANTE PARA VIGAS
CHEQUEO PARA LA CONDICIÓN DESCRITA EN C.21.3.3 (b)

$f_c = 21.0$ MPa
 $f_y = 420$ MPa
 $\phi_{corte} = 0.75$
Estribo $\phi = 9.5$ mm
 $A_v = 71$ mm²
 $R = 6.30$

ZVE = Cortante maximo obtenido de las combinaciones de carga de diseño que incluyan E, considerando E, como el doble del prescrito por el reglamento general legalmente adoptado para diseño sismico vigente.

COMB053 = 1.2CM+1.0CV+(2*1.0Ex)+(2*0.3Ey)
COMB054 = 1.2CM+1.0CV+(2*1.0Ex)+(2*0.3Ey)
COMB055 = 1.2CM+1.0CV+(2*1.0Ex)+(2*0.3Ey)
COMB056 = 1.2CM+1.0CV+(2*1.0Ex)+(2*0.3Ey)
COMB057 = 1.2CM+1.0CV+(2*0.3Ex)+(2*1.0Ey)
COMB058 = 1.2CM+1.0CV+(2*0.3Ex)+(2*1.0Ey)

COMB059 = 1.2CM+1.0CV+(2*0.3Ex)+(2*1.0Ey)
COMB060 = 1.2CM+1.0CV+(2*0.3Ex)+(2*1.0Ey)
COMB061 = 1.2CM+1.0CV+(2*0.3Ex)+(2*1.0Ey)
COMB062 = 0.9CM+(2*0.3Ex)+(2*0.3Ey)
COMB063 = 0.9CM+(2*1.0Ex)+(2*0.3Ey)
COMB064 = 0.9CM+(2*1.0Ex)+(2*0.3Ey)

COMB065 = 0.9CM+(2*0.3Ex)+(2*1.0Ey)
COMB066 = 0.9CM+(2*0.3Ex)+(2*1.0Ey)
COMB067 = 0.9CM+(2*0.3Ex)+(2*1.0Ey)
COMB068 = 0.9CM+(2*0.3Ex)+(2*1.0Ey)
COMB069 = 0.9CM+(2*0.3Ex)+(2*1.0Ey)
COMB070 = 0.9CM+(2*0.3Ex)+(2*1.0Ey)

NIVEL	VIGA	LOC.	LONG.	PROFESIONES DEL ELEMENTO										Z _{VE}																2V _{max}	S	ØV _c	ØV _c	ØV _n	ØV _n > 2V _{max}
				SECCION	b (m)	d (m)	V2						Combinaciones de carga de diseño para el cálculo del cortante donde se incluye E																						
							C.M. (kN.m)	C.V. (kN.m)	ESMO X (kN.m)	ESMO Y (kN.m)	ESMO X (kN.m)	ESMO Y (kN.m)	COMB055 (kN.m)	COMB056 (kN.m)	COMB057 (kN.m)	COMB058 (kN.m)	COMB059 (kN.m)	COMB060 (kN.m)	COMB061 (kN.m)	COMB062 (kN.m)	COMB063 (kN.m)	COMB064 (kN.m)	COMB065 (kN.m)	COMB066 (kN.m)	COMB067 (kN.m)	COMB068 (kN.m)	COMB069 (kN.m)	COMB070 (kN.m)							
N+3.45	B227	0	1.65	VIG03H45	0.20	0.40	-2.03	0.31	1.1	3.92	5.68	20.14	1.505	0.838	0.792	0.803	1.201	1.033	1.323	1.946	1.466	0.729	0.803	0.034	0.234	1.152	0.634	1.402	1.640	15.7	0.10	178.32	45.83	234.75	OK
N+3.45	B227	1.65					9.83	3.24	1.1	3.92	7.48	20.94	15.307	13.972	14.213	12.788	15.711	15.283	11.305	11.337	8.208	7.783	0.024	0.509	0.522	0.884	5.576	5.148							
N+3.45	B228	0	1.65	VIG03H45	0.20	0.40	-1.36	0.2	0.9	4.2	5.88	20.14	2.149	1.194	1.808	3.351	2.762	3.096	4.946	5.098	2.801	2.948	2.088	1.728	2.174	2.448	5.998	6.301	14.2	0.10	178.32	45.83	234.75	OK	
N+3.45	B228	1.65					3.7	3.002	0.9	4.2	5.88	20.14	13.802	12.703	12.444	11.539	14.129	13.896	10.306	9.903	8.323	7.128	7.004	5.989	6.540	8.205	4.626	4.362							
N+3.45	B229	0	1.65	VIG03H45	0.20	0.40	-1.17	0.71	2.64	5.06	12.1	32.78	0.034	1.468	1.386	2.788	0.733	0.685	4.626	5.085	0.393	1.109	0.507	2.429	0.124	0.326	4.378	4.726	22.0	0.10	178.32	45.83	234.75	OK	
N+3.45	B229	1.65					10.69	3.44	2.64	5.06	12.1	32.78	16.928	18.420	18.248	16.750	17.107	17.647	21.597	22.047	10.281	11.783	11.603	13.103	10.950	11.000	14.950	15.400							
N+3.45	B40	0					70.15	30.35	10.28	3.44	12.1	32.78	104.526	110.487	116.234	116.288	117.580	122.815	123.289	68.811	69.781	64.528	47.517	42.571	44.962	48.308	48.814								
N+3.45	B40	3.475					-32.01	-12.4	10.28	3.44	12.1	32.78	47.580	52.569	49.312	54.296	49.348	50.842	55.007	58.201	25.285	30.588	27.330	32.240	27.245	28.879	33.094	34.588	123.5	0.10	178.32	68.74	247.66	OK	
N+3.45	B41	0					22.01	6.82	10.36	4.04	32.51	61.64	36.488	38.381	40.699	42.581	34.602	35.221	48.057	48.128	23.265	25.166	25.138	21.429	22.008	25.134	25.905								
N+3.45	B41	3.475					61.15	20.56	20.56	4.04	32.51	61.64	103.396	105.292	107.587	108.489	101.560	102.131	115.405	116.036	58.491	60.392	62.682	64.564	56.655	57.226	70.560	71.131	110.0	0.10	178.32	68.74	247.66	OK	
N+3.45	B42	0	2.5	VIG03H45	0.20	0.40	8.22	-2.66	1.3	1.64	32.54	-61.64	11.251	22.591	21.603	27.832	17.401	18.703	31.288	31.680	7.145	12.465	11.507	6.927	2.086	4.687	21.880	23.494	33.6	0.10	178.32	45.83	234.75	OK	
N+3.45	B42	2.5					7.83	7.08	1.1	1.64	32.54	-61.64	17.620	12.289	13.187	7.887	17.689	18.087	2.882	1.280	7.300	1.960	2.088	-2.482	7.360	5.703	7.487	9.909							
N+3.45	B43	0	1.5	VIG03H45	0.20	0.40	-2.01	0.8	0.36	1.1	1.68	11.1	3.099	2.226	0.623	1.750	1.019	2.757	1.452	1.176	1.696	0.823	1.220	0.347	1.616	1.354	0.029	0.233	13.2	0.10	178.32	45.83	234.75	OK	
N+3.45	B43	1.5					8.09	1.45	0.36	1.1	1.68	11.1	11.271	12.144	11.787	12.620	11.351	11.613	12.838	13.000	7.394	8.267	7.870	8.743	7.474	7.738	0.861	0.323							
N+3.45	B44	0	3.475	VIG03H45	0.30	0.40	-12.36	-14.88	5.74	2.6	1.68	6.08	72.752	77.020	74.469	76.701	80.128	77.809	77.027	76.880	46.309	46.342	46.951	43.633	47.240	47.561	48.718	48.923							
N+3.45	B44	3.475					-5.22	-2.81	5.74	2.6	1.68	6.08	11.1	8.039	8.884	8.691	10.536	8.389	8.941	10.563	11.116	3.663	5.508	4.315	4.180	4.012	4.965	6.187	6.740	78.1	0.10	178.32	68.74	247.66	OK
N+3.45	B47	0	3.475	VIG03H45	0.30	0.40	2.23	1.4	4.9	1.14	1.68	6.08	11.1	8.908	3.187	4.325	2.654	4.490	3.977	2.547	2.034	2.839	1.128	2.236	0.945	2.421	1.908	0.478	0.035						
N+3.45	B47	3.475					50.26	13.46	4.9	1.14	1.68	6.08	74.604	72.258	74.117	71.771	74.186	73.482	72.504	71.860	46.066	43.720	45.579	43.233	45.648	44.944	44.026	43.122	74.6	0.10	178.32	68.74	247.66	OK	

**VERIFICACIONES DE CORTANTE
PARA COLUMNAS**

C.21.3.3.2 (a)

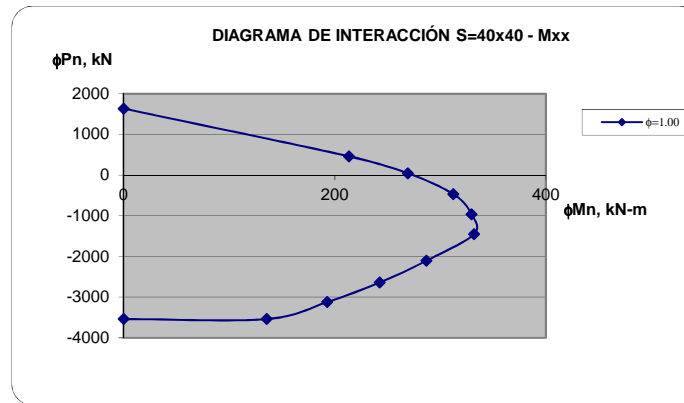
C.21.3.3.2 (b)

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, CLL 17 N°3N-102 IPIALES (NARIÑO)
RESISTENCIA A CORTANTE PARA COLUMNAS
CHEQUEO PARA LA CONDICIÓN DESCRITA EN C.21.3.3 (a) - COLUMNAS S=40X40- 12#7

$f_c =$	21.0	MPa	Estribos $\Phi =$	9.5	mm
$f_y =$	420	MPa	$A_v =$	71	mm ²
$\Phi_{\text{Cortante}} =$	0.75		Cantidad de ramas =	2	
$b_x =$	0.40	m	$S =$	0.20	m
$b_y =$	0.40	m	Recub. =	0.05	m
$L_{col} =$	3.05	m			

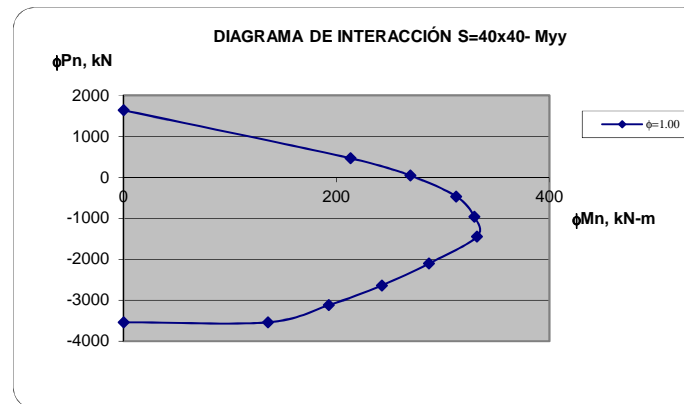
C.21.3.3.2(a) El cortante ΦV_n no debe ser menor que la suma del cortante debido a flexión en curvatura inversa asociado con el desarrollo de los momentos nominales de la columna en cada extremo restringido de la longitud libre.

DATOS PARA LOS DIAGRAMAS DE ITERACIÓN			
No.	Curve 1	0. degrees	
	P	M3	M2
1	-3538.00	0.00	0.00
2	-3538.00	135.51	0.00
3	-3119.00	192.72	0.00
4	-2638.00	242.52	0.00
5	-2105.00	286.71	0.00
6	-1450.00	331.90	0.00
7	-963.91	329.52	0.00
8	-466.65	312.36	0.00
9	44.98	269.27	0.00
10	463.83	213.29	0.00
11	1636.64	0.00	0.00



$$\begin{aligned}
 P_{ua} &= -645.50 \text{ kN} \\
 P_{ub} &= -637.44 \text{ kN} \\
 \Phi M_{na} &= 196.77 \text{ kN-m} \\
 \Phi M_{nb} &= 229.54 \text{ kN-m} \\
 V_{umax} &= 139.78 \text{ kN} \\
 \Phi V_s &= 78.28 \text{ kN} \\
 \Phi V_c &= 80.20 \text{ kN} \\
 \Phi V_n &= 158.47 \text{ kN} \\
 \Phi V_n > V_{umax} &= \text{OK}
 \end{aligned}$$

DATOS PARA LOS DIAGRAMAS DE ITERACIÓN			
No.	Curve 7	90. degrees	
	P	M3	M2
1	-3538.00	0.00	0.00
2	-3538.00	0.00	135.51
3	-3119.00	0.00	192.72
4	-2638.00	0.00	242.52
5	-2105.00	0.00	286.71
6	-1450.00	0.00	331.90
7	-963.91	0.00	329.52
8	-466.65	0.00	312.36
9	44.98	0.00	269.27
10	463.83	0.00	213.29
11	1636.64	0.00	0.00



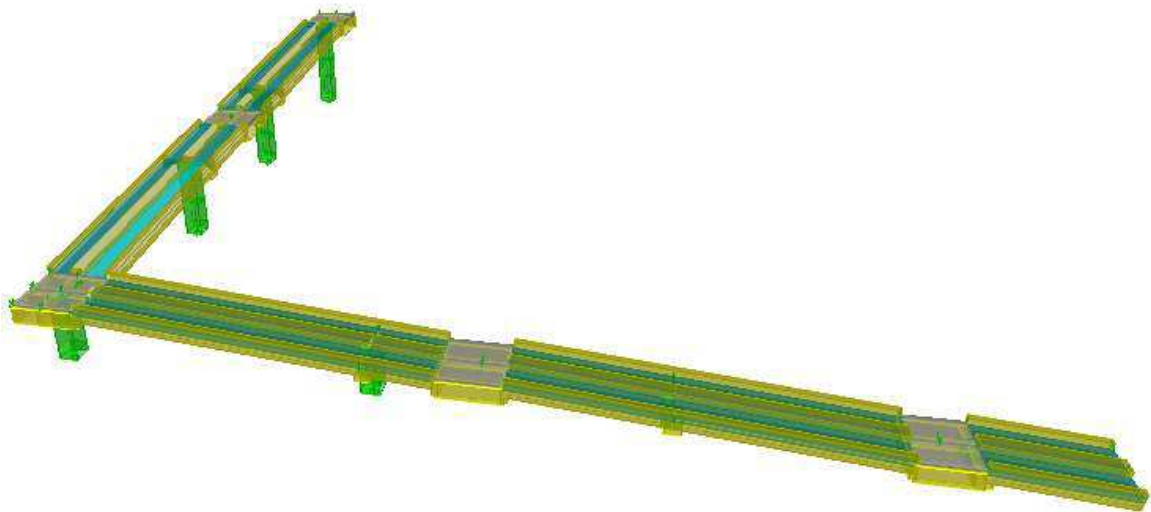
$$\begin{aligned}
 P_{ua} &= -649.07 \text{ kN} \\
 P_{ub} &= -641.00 \text{ kN} \\
 \Phi M_{na} &= 196.78 \text{ kN-m} \\
 \Phi M_{nb} &= 229.55 \text{ kN-m} \\
 V_{umax} &= 139.78 \text{ kN} \\
 \Phi V_s &= 78.28 \text{ kN} \\
 \Phi V_c &= 80.20 \text{ kN} \\
 \Phi V_n &= 158.47 \text{ kN} \\
 \Phi V_n > V_{umax} &= \text{OK}
 \end{aligned}$$

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, CLL 17 N°3N-102 IPIALES (NARIÑO)
RESISTENCIA A CORTANTE PARA COLUMNAS
CHEQUEO PARA LA CONDICIÓN DESCRITA EN C.21.3.3 (b) - COLUMNA S=40X40

$f_c =$	21.0	MPa	Φ Estribos	9.5	mm	C.21.3.3.2(b) El cortante ΦV_n no debe ser menor que el cortante maximo obtenido de las combinaciones de carga de diseño que incluyan E, con E incrementado por medio de Ω_o .
$f_y =$	420	MPa	$A_v =$	71	mm ²	
Φ Cortante	0.75		Cantidad de ramas	4		
$b_x =$	0.40	m	$S =$	0.20	m	
$b_y =$	0.40	m	$\Omega_o =$	3.00		
			Recub. =	0.05	m	

Para cortante V2			Para cortante V3		
$\Omega_o * V_{umax} =$	76.40	kN	$\Omega_o * V_{umax} =$	57.73	kN
$\Phi V_s =$	156.56	kN	$\Phi V_s =$	156.56	kN
$\Phi V_c =$	80.20	kN	$\Phi V_c =$	80.20	kN
$\Phi V_n =$	236.75	kN	$\Phi V_n =$	236.75	kN
$\Phi V_n > \Omega_o * V_{umax} =$	OK		$\Phi V_n > \Omega_o * V_{umax} =$	OK	

**PROYECTO: INSTITUCIÓN EDUCATIVA
BARRIO OBRERO-RAMPA, CLL 17 N°
3N-102
dye16-2253**



**MEMORIAS DE ANÁLISIS
Y DISEÑO ESTRUCTURAL**

BOGOTÁ D.C., 09 DE ABRIL DE 2016

1. DESCRIPCIÓN DEL PROYECTO

1.1. INTRODUCCIÓN

El presente documento contiene las memorias de análisis y diseño estructural correspondiente al proyecto INSTITUCIÓN EDUCATIVA BARRIO OBRERO-RAMPA ubicado CLL 17 N° 3N-102 en el municipio de Ipiales en el departamento de Nariño.

1.2. DESCRIPCIÓN ARQUITECTÓNICA

El proyecto se encuentra ubicado en un lote de **1400 m²** de área aproximadamente, en la cual se contempla la construcción de la Institución educativa Barrio Obrero de dos (2) niveles. El lote será destinado para uso Institucional.

1.3. DESCRIPCIÓN SISTEMA ESTRUCTURAL

El proyecto se soluciona mediante la construcción de una estructura aporticada en concreto, con placa maciza y vigas descolgadas. Se manejan luces que varían entre 2.00m y 6.50m en los dos sentidos de la estructura.

Para el análisis se empleó el programa de computador **ETABS v.9.7.4.**, el cual tiene en cuenta los efectos de segundo orden. Las consideraciones sísmicas empleadas en el análisis estructural del proyecto son las siguientes:

Para la Rampa Peatonal:

- | | |
|---|--------------------------------|
| ✓ Método de análisis: | Análisis Modal |
| ✓ Zona de amenaza sísmica: | Alta |
| ✓ Capacidad de disipación de energía: | Especial |
| ✓ Coeficiente de disipación de energía: | $R_o = 1.50$ |

Las cargas horizontales fueron distribuidas entre los diferentes pórticos en proporción a su rigidez y teniendo en cuenta los efectos de torsión.

El dimensionamiento dado a todos los elementos que intervienen en las estructuras satisfacen los requerimientos de sollicitación ocasionados por las derivas presentes. Las cargas vivas de diseño son: **2.00 kN/m²** para salones de

clase, **1.80 kN/m²** para cubierta (Tipo de cubierta F), **5.00 kN/m²** para escaleras, corredores y rampa, de acuerdo a lo establecido en las tablas 4.2.1-1 y 4.2.1-2 de la NSR-10.

Para la cimentación se siguieron las recomendaciones descritas en el respectivo estudio de suelos. Se diseñaron zapatas aisladas para apoyar la estructura a una profundidad de **-1.00m** y conectadas entre sí por vigas de amarre según lo establecido en A.3.6.4.2, de acuerdo a lo indicado en los cortes y detalles que aparecen en los planos estructurales. La capacidad portante de seguridad admisible del suelo utilizada para el dimensionamiento de la cimentación es de **0.151 MPa**. El perfil de suelo es tipo **D**.

El diseño de todas las estructuras se realizó basado en la Norma Colombiana de Diseño y Construcción Sismo Resistente Ley 400 de 1997 (Modificada Ley 1229 de 2008) y Decreto 926 de Marzo de 2010, Decreto 092 del 17 de Enero de 2011, Decreto 0340 del 13 de Febrero de 2012 y en el Reglamento para Concreto Estructural ACI 318S-08.

1.4. MATERIALES

Los materiales utilizados son:

Concreto	21.1 MPa para vigas, placas, zapatas y columnas.
Concreto	14 MPa (para concreto de limpieza).
Acero	para refuerzo $f_y = 420$ MPa para todos los diámetros.

Atentamente:

EDGAR ROLANDO BARRERA
ING. ESTRUCTURAL
T.P. 15202-102710 BYC

JAIR USECHE MACÍAS
ING. ESTRUCTURAL
T.P. 25202-56174 CND

MEMORIAL DE RESPONSABILIDAD

IPIALES, % BcJ Ya VfY de 2016.

Señores
PLANEACION MUNICIPAL
La Ciudad

Yo, **EDGAR ROLANDO BARRERA**, ingeniero civil con Matrícula Profesional N° **15202-102710** de **BOYACÁ**, y Yo, **JAIR USECHE MACÍAS**, ingeniero civil con Matrícula Profesional N° **25202-56174** de **CUNDINAMARCA** debidamente registrados en el consejo profesional de Ingeniería y Arquitectura de Boyacá y Cundinamarca, presentamos los Cálculos y Diseños Estructurales elaborados de acuerdo a los requerimientos de la **NORMA COLOMBIANA DE DISEÑO Y CONSTRUCCIÓN SISMO RESISTENTE LEY 400 DE 1997 (MODIFICADA LEY 1229 DE 2008) Y DECRETO 926 DE MARZO DE 2010**, para el INSTITUCIÓN EDUCATIVA BARRIO OBRERO-RAMPA, ubicado en la calle 17 N° 3N-102, del municipio de Ipiales en el departamento de Nariño, declaramos que asumimos la responsabilidad por los perjuicios que causa de ellos puedan deducirse, exonerando a PLANEACION MUNICIPAL de cualquier responsabilidad.

Aceptamos y reconocemos que la revisión efectuada por PLANEACION MUNICIPAL no constituye una aprobación al Diseño Estructural, sino una verificación del cumplimiento de la **NORMA COLOMBIANA DE DISEÑO Y CONSTRUCCIÓN SISMO RESISTENTE**.

Atentamente,

EDGAR ROLANDO BARRERA
ING. ESTRUCTURAL
T.P. 15202-102710 BYC

JAIR USECHE MACÍAS
ING. ESTRUCTURAL
T.P. 25202-56174 CND

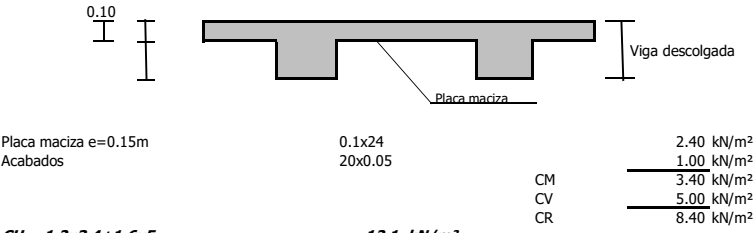


2. AVALÚO DE CARGAS

AVALÚO DE CARGAS

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO- RAMPA,
CLL 17 N°3N-102 IPIALES (NARIÑO)
AVALUO DE CARGAS- RAMPA PEATONAL

1. PLACA MACIZA- RAMPA



$CU = 1.2 \times 3.4 + 1.6 \times 5 = 12.1 \text{ kN/m}^2$

Espesor de placa equivalente:

$e = CM/24 = 0.142 \text{ m}$

3. ANÁLISIS SÍSMICO

*ANÁLISIS MODAL
CÁLCULO DE DERIVAS MÁXIMAS*

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO- RAMPA
CLL 17 N° 3N-102 IPIALES (NARIÑO)
ANÁLISIS SÍSMICO (ESPECTRO DE DISEÑO NSR-10)

ZONA DE AMENAZA SÍSMICA
ALTA

EFFECTOS LOCALES

Perfil de Suelo	D
Coefficiente Aa	0.30
Coefficiente Av	0.25

COEFICIENTE DE IMPORTANCIA

Grupo de Uso	III
Coefficiente de importancia I	1.25

PERIODO FUNDAMENTAL DE LA EDIFICACIÓN

$T_a = C_t h^\alpha$		
$C_t =$	0.047	
$h =$	3.50	m
$\alpha =$	0.90	
$T_a =$	0.15	Seg

VARIACIÓN COEFICIENTE DE CAPACIDAD DE DISIPACIÓN DE ENERGÍA

R_o : Coeficiente de capacidad de disipación de energía básico

R : Coeficiente de capacidad de disipación de energía, para ser empleado en el diseño.

ϕ_a : Coeficiente de reducción de R causado por irregularidades en altura de la edificación

ϕ_p : Coeficiente de reducción de R causado por irregularidades en planta de la edificación

ϕ_r : Coeficiente de reducción de R causado por ausencia de redundancia en el sistema estructural de resistencia sísmica

R_o	1.50
ϕ_a	1.00
ϕ_p	1.00
ϕ_r	1.00
ϕ	1.00
R	1.50

TIPO	DESCRIPCIÓN	VALOR
	N.A	ϕ_p : 1.00
		ϕ_a : 1.00
	REDUNDANCIA	ϕ_r : 1.00
	UNIONES SOLDADAS	ϕ : 1.00

ESPECTRO DE DISEÑO (AMORTIGUAMIENTO $\xi=5\%$ DEL CRÍTICO)

Fa: Factor de ampliación de la aceleración.

Fv: Factor de ampliación de la aceleración en el rango de velocidades constantes.

Sa: Valor del espectro de aceleraciones de diseño para un periodo de vibración dado.

Aa: Coeficiente que representa la aceleración horizontal pico efectiva para diseño.

Av: Coeficiente que representa la velocidad horizontal pico efectiva para diseño.

T: Periodo de vibración del sistema elástico, en segundos.

T_C : Periodo de vibración, en segundos, correspondiente a la transición entre la zona de aceleración constante del espectro de diseño, para periodos cortos, y la parte descendiente del mismo.

T_L : Periodo de vibración, en segundos, correspondiente al inicio de la zona de desplazamiento aproximadamente constante del espectro de diseño para periodos largos.

ZONA DE AMENAZA ALTA

T_0 :	0.13	Seg
T_C :	0.63	Seg
T_L :	4.56	Seg
Aa:	0.30	
Av:	0.25	
Fa:	1.20	
Fv:	1.90	

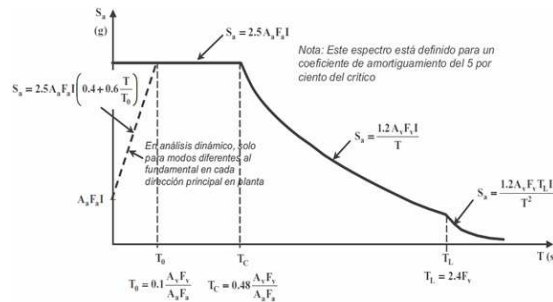
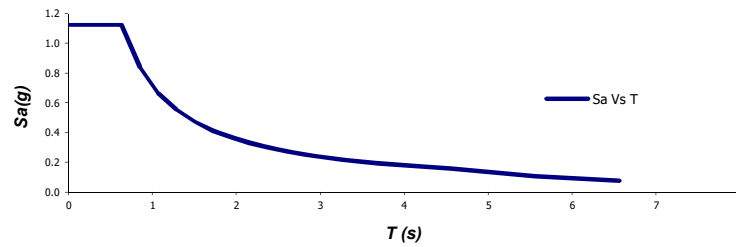


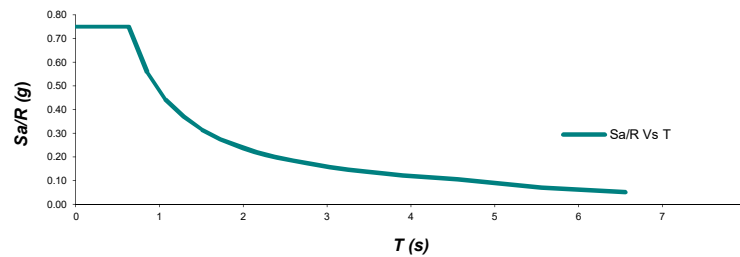
Figura A.2.6-1 — Espectro Elástico de Aceleraciones de Diseño como fracción de g

T	Sa	Sa/R _{adoptado}
(Seg)	(%g)	(%g)
0.00	1.125	0.750
0.03	1.125	0.750
0.07	1.125	0.750
0.10	1.125	0.750
0.13	1.125	0.750
0.26	1.125	0.750
0.38	1.125	0.750
0.51	1.125	0.750
0.63	1.125	0.750
0.85	0.837	0.558
1.07	0.666	0.444
1.29	0.553	0.369
1.51	0.473	0.315
1.72	0.413	0.276
1.94	0.367	0.245
2.16	0.330	0.220
2.38	0.300	0.200
2.60	0.274	0.183
2.81	0.253	0.169
3.03	0.235	0.157
3.25	0.219	0.146
3.47	0.205	0.137
3.69	0.193	0.129
3.91	0.182	0.122
4.12	0.173	0.115
4.34	0.164	0.109
4.56	0.156	0.104
5.56	0.105	0.070
6.56	0.075	0.050

Espectro Elástico de Diseño



Espectro Elástico de Diseño/ R_{adop}



Sistema de resistencia Sísmica: Pórticos resistentes a momentos con Capacidad Especial de Disipación de Energía (DES).

Nota: El sistema de pórtico es un sistema estructural compuesto por un pórtico espacial, resistente a momentos, esencialmente completo, sin diagonales, que resiste todas las cargas verticales y las fuerzas horizontales.

MODELO MATEMÁTICO

Modelo Tridimensional con Diafragma Rígido: En este modelo los entrepisos se consideran diafragmas infinitamente rígidos en su propio plano. La masa de cada diafragma se considera concentrada en su centro de masa. Los efectos torsionales accidentales son incluidos haciendo ajustes en la localización de los centros de masa de los diafragmas. Los efectos direccionales son tomados en cuenta a través de las componentes de los desplazamientos de los grados de libertad horizontales ortogonales del diafragma.

PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO- RAMPA
CLL 17 N° 3N-102 IPIALES (NARIÑO)
ANÁLISIS SÍSMICO (ESPECTRO DE UMBRAL DE DAÑO NSR-10)

ZONA DE AMENAZA SÍSMICA
ALTA

EFFECTOS LOCALES

Perfil de Suelo	D
Coefficiente Ad	0.08
Coefficiente Fv	2.40

COEFICIENTE DE IMPORTANCIA

Grupo de Uso	III
Coefficiente de importancia I	1.25
Coefficiente de Sitio S:	3.00

ESPECTRO DE UMBRAL DE DAÑO (AMORTIGUAMIENTO $\xi=2\%$ DEL CRÍTICO)

Sad: Valor del espectro de aceleraciones del umbral de daño para un periodo de vibración dado.

Ad: Máxima aceleración pico efectiva para el umbral de daño.

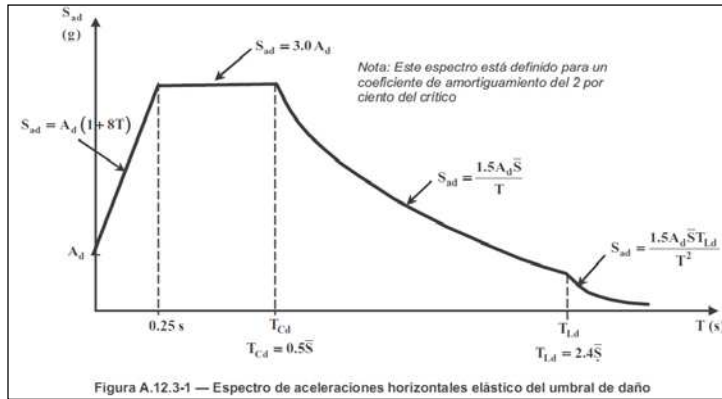
T: Periodo de vibración del sistema elástico, en segundos.

T_{Cd}: Periodo de vibración, en segundos, correspondiente a la transición entre la zona de aceleración constante del espectro sísmico del umbral de daño, para periodos cortos, y la parte descendiente del mismo.

T_{Ld}: Periodo de vibración, en segundos, correspondiente a la transición entre la zona de desplazamiento constante del espectro sísmico del umbral de daño, para periodos largos.

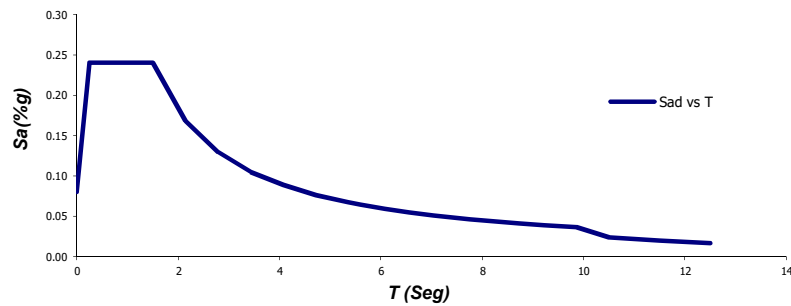
Ad: 0.08
T_{Cd}: 1.50 Seg
T_{Ld}: 7.2 Seg

T (Seg)	Sad (%g)
0.00	0.080
0.05	0.112
0.10	0.144
0.15	0.176
0.20	0.208
0.25	0.240
0.41	0.240
0.56	0.240
0.72	0.240
0.88	0.240
1.03	0.240
1.19	0.240
1.34	0.240



1.50	0.240
2.14	0.168
2.79	0.129
3.43	0.105
4.07	0.088
4.71	0.076
5.36	0.067
6.00	0.060
6.64	0.054
7.29	0.049
7.93	0.045
8.57	0.042
9.21	0.039
9.86	0.037
10.50	0.024
11.50	0.020
12.50	0.017

Espectro Del Umbral de Daño



Sistema de resistencia Sísmica: Pórticos resistentes a momentos con Capacidad Especial de Disipación de Energía (DES).

Nota: El sistema de pórtico es un sistema estructural compuesto por un pórtico espacial, resistente a momentos, esencialmente completo, sin diagonales, que resiste todas las cargas verticales y las fuerzas horizontales.

MODELO MATEMÁTICO

Modelo Tridimensional con Diafragma Rígido: En este modelo los entrepisos se consideran diafragmas infinitamente rígidos en su propio plano. La masa de cada diafragma se considera concentrada en su centro de masa. Los efectos torsionales accidentales son incluidos haciendo ajustes en la localización de los centros de masa de los diafragmas. Los efectos direccionales son tomados en cuenta a través de las componentes de los desplazamientos de los grados de libertad horizontales ortogonales del diafragma.



PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO- RAMPA, IPIALES (NARIÑO)
CALCULO DEL CORTANTE BASAL DE LA ESTRUCTURA (ESPECTRO DE DISEÑO NSR-10)

CALCULO DEL CORTANTE BASAL DE LA ESTRUCTURA

$H_{\text{edificio}} =$	3.50	m	
Tipo de Perfil:	D		
$A_a =$	0.30		
$A_v =$	0.25		
$F_a =$	1.20		
$F_v =$	1.90		
$T_c =$	0.63	Seg	
$C_t =$	0.047		
$\alpha =$	0.90		
$T_a =$	0.15	Seg	
$C_u =$	1.20		
$C_u T_a =$	0.17	Seg	
$T_{\text{modelación estructural}} =$	0.15	Seg	
$\Delta T =$	3.36	%	Ok!
$T_{\text{adoptado}} =$	0.15	Seg	
$S_a =$	1.125		S_a obtenido del espectro de diseño
$g =$	9.81	m/s ²	
$M =$	80.50	Ton	Masa obtenida del modelo
$V_s =$	888.42	kN	
90% $V_s =$	799.58	kN	Cortante basal para comparación de acuerdo a A.5.4.5 NSR-10

MODELO INICIAL

Response Spectrum Base Reactions

PORCENTAJE PARA REVISIÓN DE CORTANTE BASAL DE ACUERDO A A.5.4.5 NSR-10: 90.0 %

	F1	F2	Factor	g corregido
$V_{s(x)} =$	303.81	-	2.632	25.818
$V_{s(y)} =$	-	504.12	1.586	15.559

MODELO CORREGIDO

Response Spectrum Base Reactions

	F1	F2	90% V_s
$V_{s(x)} =$	799.58	-	799.6
$V_{s(y)} =$	-	799.55	799.6



PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO- RAMPA, IPIALES (NARIÑO)
CALCULO DEL CORTANTE BASAL DE LA ESTRUCTURA (ESPECTRO DE UMBRAL DE DAÑO NSR-10)

CALCULO DEL CORTANTE BASAL DE LA ESTRUCTURA

H _{edificio} =	3.50	m	
Tipo de Perfil:	D		
Ad =	0.08		
Fv =	2.40		
C _t =	0.047		
α =	0.90		
T _a =	0.15	Seg	
C _u =	1.20		
C _u T _a =	0.17	Seg	
T _{modelación estructural} =	0.15	Seg	
ΔT =	3.36	%	Ok!
T _{adoptado} =	0.15	Seg	
S _a =	0.240		S _a obtenido del espectro de diseño
g =	9.81	m/s ²	
M =	80.50	Ton	Masa obtenida del modelo
V _s =	189.53	kN	

MODELO INICIAL
Response Spectrum Base Reactions

PORCENTAJE PARA REVISIÓN DE CORTANTE BASAL DE ACUERDO A A.5.4.5 NSR-10: 100.0 %

	F1	F2	Factor	g corregido
V _s (x) =	42.21	-	4.490	44.048 Se aplica en SISMO X
V _s (y) =	-	61.99	3.057	29.993 Se aplica en SISMO Y

MODELO CORREGIDO
Response Spectrum Base Reactions

	F1	F2	100% Vs
V _s (x) =	189.55	-	189.5
V _s (y) =	-	189.53	189.5

4. DISEÑO DE CIMENTACIÓN

DISEÑO DE CIMENTACIÓN



PROYECTO: INSTITUCION EDUCATIVA BARRIO OBRERO - RAMPA
Elección de cargas y momentos para calculos de Esfuerzos y Áreas del Diseño de Cimentación

Combinaciones de carga

Cargas Gravitacionales:

Cargas por Estado Limite de Servicio

$CIMEN = 1D + 1L$

$CIMEN2 = 1D + 0.75L + 0.70 \cdot (0.75/R)Ex + 0.21 \cdot (0.75/R)Ey$

$CIMEN3 = 1D + 0.75L + 0.21 \cdot (0.75/R)Ex + 0.70 \cdot (0.75/R)Ey$

NSR-10

B.2.3-2

B.2.3-8

Story	Point	Load	FX	FY	FZ	MX	MY	MZ	Load	Max (Mx:My)	COMBINACIÓN	Pumax
BASE	1	CIMEN1	-6.320	-0.050	158.100	0.430	17.541	0.402	CIMEN1	17.541		
BASE	1	CIMEN2 MAX	84.870	39.940	150.010	8.934	32.568	42.570	CIMEN2 MAX	32.568		
BASE	1	CIMEN2 MIN	-96.330	-40.030	137.120	-8.157	-1.337	-41.846	CIMEN2 MIN	8.157	CIMEN1	158.1
BASE	1	CIMEN3 MAX	38.570	39.400	146.970	9.608	23.343	32.576	CIMEN3 MAX	23.343		
BASE	1	CIMEN3 MIN	-50.020	-39.480	140.160	-8.831	7.888	-31.853	CIMEN3 MIN	8.831		
BASE	2	CIMEN1	44.610	-0.040	172.700	0.247	17.568	0.202	CIMEN1	17.568		
BASE	2	CIMEN2 MAX	97.330	18.630	159.310	12.907	46.608	5.818	CIMEN2 MAX	46.608		
BASE	2	CIMEN2 MIN	-16.220	-18.710	154.710	-12.457	-14.839	-5.454	CIMEN2 MIN	14.839	CIMEN1	172.7
BASE	2	CIMEN3 MAX	68.960	32.980	158.130	19.971	32.080	4.056	CIMEN3 MAX	32.08		
BASE	2	CIMEN3 MIN	12.150	-33.060	155.890	-19.521	-0.310	-3.693	CIMEN3 MIN	19.521		
BASE	3	CIMEN1	25.880	0.380	202.380	-3.543	9.089	0.318	CIMEN1	9.089		
BASE	3	CIMEN2 MAX	70.750	74.270	187.370	75.396	46.779	10.372	CIMEN2 MAX	75.396		
BASE	3	CIMEN2 MIN	-24.890	-73.590	180.960	-81.770	-30.607	-9.799	CIMEN2 MIN	81.77	CIMEN1	202.38
BASE	3	CIMEN3 MAX	48.320	59.960	185.610	62.021	28.593	10.741	CIMEN3 MAX	62.021		
BASE	3	CIMEN3 MIN	-2.450	-59.280	182.730	-68.395	-12.420	-10.168	CIMEN3 MIN	68.395		
BASE	4	CIMEN1	-64.02	-36.14	186.51	6.065	-35.04	-1.665	CIMEN1	35.04		
BASE	4	CIMEN2 MAX	-30.33	4.76	185.76	54.718	-0.265	12.311	CIMEN2 MAX	54.718		
BASE	4	CIMEN2 MIN	-84.92	-69.69	155.05	-43.944	-62.812	-15.306	CIMEN2 MIN	62.812	CIMEN1	186.51
BASE	4	CIMEN3 MAX	-43.66	80.29	189.26	157.318	-15.366	6.502	CIMEN3 MAX	157.318		
BASE	4	CIMEN3 MIN	-71.58	-145.22	151.55	-146.544	-47.711	-9.497	CIMEN3 MIN	146.544		
BASE	5	CIMEN1	-0.71	21.68	178.55	-21.494	2.668	-0.124	CIMEN1	21.494		
BASE	5	CIMEN2 MAX	78.82	47.37	165.94	18.088	176.842	11.83	CIMEN2 MAX	176.842		
BASE	5	CIMEN2 MIN	-80.09	-8.53	160.7	-56.684	-172.042	-12.052	CIMEN2 MIN	172.042	CIMEN1	178.55
BASE	5	CIMEN3 MAX	41.21	98.08	166.61	92.146	87.17	6.461	CIMEN3 MAX	92.146		
BASE	5	CIMEN3 MIN	-42.48	-59.24	160.03	-130.742	-82.37	-6.683	CIMEN3 MIN	130.742		
BASE	6	CIMEN1	0.53	-7.1	185.59	2.616	2.126	-0.143	CIMEN1	2.616		
BASE	6	CIMEN2 MAX	90.74	12.34	172.05	31.78	232.352	13.855	CIMEN2 MAX	232.352		
BASE	6	CIMEN2 MIN	-89.79	-24.77	167.78	-27.427	-228.526	-14.112	CIMEN2 MIN	228.526	CIMEN1	185.59
BASE	6	CIMEN3 MAX	35.95	47.77	172.71	90.699	87.567	6.86	CIMEN3 MAX	90.699		
BASE	6	CIMEN3 MIN	-35	-60.2	167.12	-86.345	-83.74	-7.117	CIMEN3 MIN	86.345		
BASE	7	CIMEN1	0.03	21.27	149.69	-26.207	0.601	-0.066	CIMEN1	26.207		
BASE	7	CIMEN2 MAX	114.61	29.48	143.83	-3.084	361.903	9.591	CIMEN2 MAX	361.903		
BASE	7	CIMEN2 MIN	-114.56	8.52	132.26	-43.81	-360.819	-9.711	CIMEN2 MIN	360.819	CIMEN1	149.69
BASE	7	CIMEN3 MAX	35.82	45.68	149.22	33.405	112.488	5.503	CIMEN3 MAX	112.488		
BASE	7	CIMEN3 MIN	-35.77	-7.67	126.86	-80.298	-111.403	-5.623	CIMEN3 MIN	111.403		

DISEÑO VIGAS DE AMARRE

PROYECTO: INSTITUCION EDUCATIVA BARRIO OBRERO - RAMPA

VIGA DE AMARRE TIPO

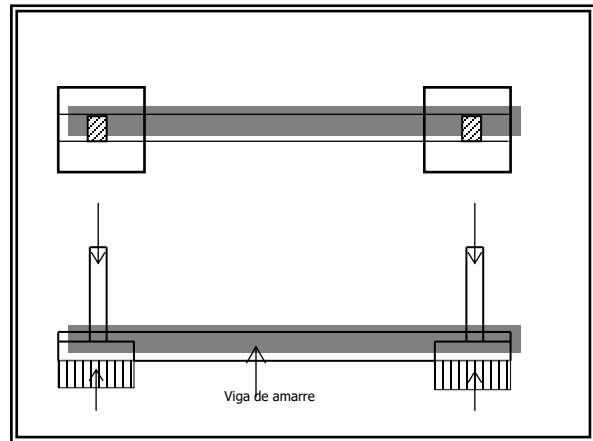
$$f_c = 21.1 \text{ MPa}$$
$$f_y = 420 \text{ MPa}$$

$$b = 0.40 \text{ m}$$
$$h = 0.50 \text{ m}$$

$$P_{\text{máx}} = 186.51 \text{ kN}$$

De acuerdo a el numeral A.3.6.4.2
de la NSR-10 tenemos:

$$A_a = 0.15$$
$$P_{\text{axial}} = 0.25 * A_a * P_{\text{máx}}$$
$$P_{\text{axial}} = 7.0 \text{ kN}$$



DISEÑO A TENSION

$$A_s = 1.7 * 6.994125 / (0.90 * 420)$$
$$A_s = 0.31 \text{ cm}^2$$

DISEÑO A COMPRESIÓN

$$P_{\text{com}} = 1.7 * 6.994125$$
$$P_{\text{com}} = 11.9 \text{ kN}$$

Para esta carga la sección requiere cuantía mínima:

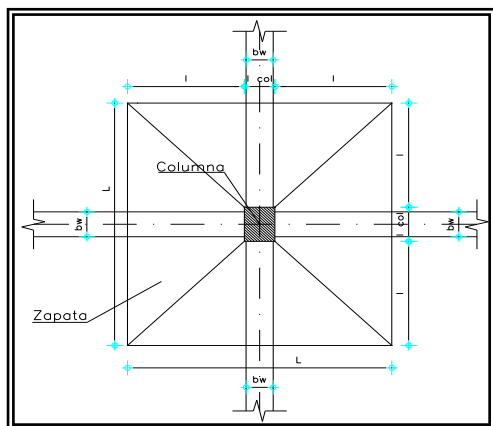
$$A_s = 0.00333 * 0.4 * 0.45$$
$$A_s = 5.99 \text{ cm}^2$$

Se suministra un refuerzo constituido por 4#4 arriba y abajo (como refuerzo mínimo).

DISEÑO DE ZAPATAS RECTANGULAR
PROYECTO: INSTITUCION EDUCATIVA BARRIO OBRERO - RAMPA
ZAPATA TIPO 3 (3 ud)-CIM1

Columna	b =	50	cm	f_c =	21.1	MPa	σ =	0.151	MPa
	t =	50	cm	f_y =	420	MPa			

PREDIMENSIONAMIENTO



L =	2.600	m		
l_{col} =	0.500	m		
l =	1.050	m		

	Cargas		
Mu =	9	kN*m	
Pu =	202.38	kN	
Pp (10%) =	20	kN	
Σ P =	223	kN	

$$\text{Area necesaria} = \frac{\Sigma P}{\sigma} = \frac{222.62}{0.151} = 1.47 \text{ m}^2$$

e =	0.04	m	L =	2.60	m
L =	1.214	m	<i>Aproximamos</i>	B =	1.30
					m

$$\text{Carga de diseño} = \frac{P_u}{A \text{ real}} = \frac{202.38}{3.380} = 0.060 \text{ MPa}$$

	Esfuerzos		
σ_{máx} =	0.073	MPa	OK
σ_{mín} =	0.052	MPa	OK

DISEÑO DE ZAPATA RECTANGULAR

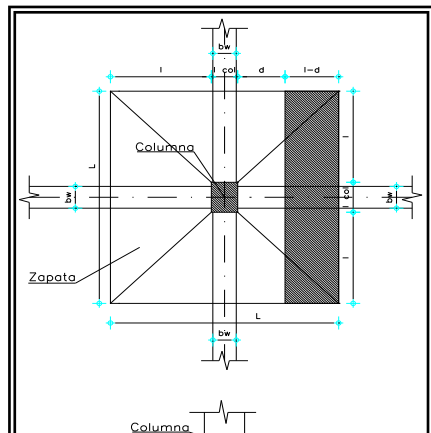
FLEXIÓN

	M borde de la columna =	43.04	kN*m
Mu =	1,7 * M borde de la columna	=	73.16
			kN*m

Con el criterio de calcular el refuerzo por metro lineal utilizamos una altura efectiva igual a:

d =	0.23	m
Cuantia =	0.00343128	
As =	7.89	cm ² /m
Armadura:	14#516c./0.20	long.
	7#529c./0.20	Transv.

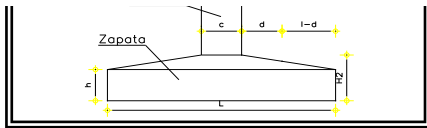
CORTANTE



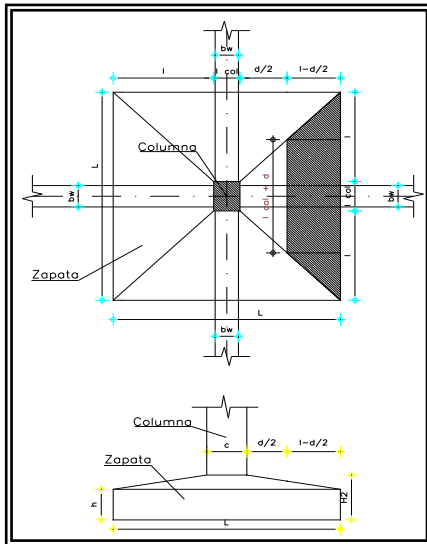
a. En una dirección (d)

L =	2.60	m	H =	0.30	m
l =	1.05	m	h =	0.30	m
l - d =	0.82	m	H - h =	0.00	m

V (d) =	148.09	kN		
Vu (d) =	1.7*V(d)			
Vu (d) =	251.75	kN	uv =	$\frac{V_u}{L * h'}$
h' =	0.23	m		= 0.421
				MPa



$$\phi v_c = 0.57 \text{ MPa} \quad \mathbf{OK}$$



b. En dos direcciones (d/2)

ZAPATA TIPO 3 (3 ud)-CIM

$$\begin{aligned} L &= 2.600 \text{ m} \\ d/2 &= 0.115 \text{ m} \\ l - d/2 &= 0.935 \text{ m} \\ V(d/2) &= 107.4 \text{ kN} \\ V_u(d/2) &= 1.5 \cdot V(d) \\ V_u(d/2) &= 161.1 \text{ kN} \\ d_1 &= 0.23 \text{ m} \end{aligned}$$

$$\begin{aligned} H &= 0.30 \text{ m} \\ h &= 0.30 \text{ m} \\ H-h &= 0.00 \text{ m} \end{aligned}$$

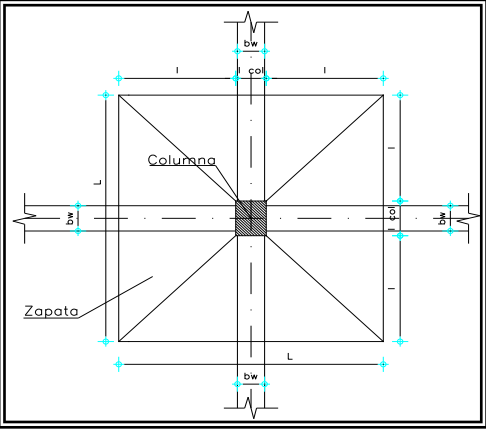
$$v_u = \frac{V_u}{b_o \times d_1} = 0.960 \text{ MPa}$$

$$\phi v_c = 1.15 \text{ MPa} \quad \mathbf{OK}$$

DISEÑO DE ZAPATA CONCENTRICA

Columna **b = 50** cm
 t = 50 cm

PREDIMENSIONAMIENTO



L =	2.00	m				Cargas
Icol =	0.50	m		Mu=	35.04	kN*m
I =	0.75	m		Pu =	186.51	kN
				Pp (10%) =	18.65	kN
				Σ P =	205.16	kN
Area necesaria =						
			$\frac{\Sigma P}{\sigma}$	=	$\frac{205.16}{0.151}$	= 1.36 m ²
e =	0.19	m				
L =	1.17	m		Aproximamos =	2.00	m
Carga de diseño =						
			$\frac{Pu}{A \text{ real}}$	=	$\frac{186.51}{4.000}$	= 0.047 MPa

Esfuerzos			
σ_{\max}=	0.080	MPa	OK
σ_{\min}=	0.022	MPa	OK

DISEÑO DE ZAPATA CONCENTRICA

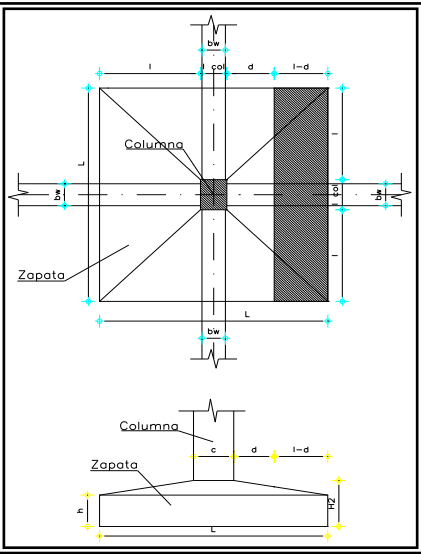
FLEXIÓN

	M borde de la columna =	27.30	kN*m
Mu =	1,7 * M borde de la columna =	46.41	kN*m

Con el criterio de calcular el refuerzo por metro lineal utilizamos una altura efectiva igual a:

d= 0.23 m
Cuantia = 0.002143
As = 4.93 cm²/m
Armadura: **11#423c./0.20**
en ambos sentidos

CORTANTE



a. En una dirección (d)

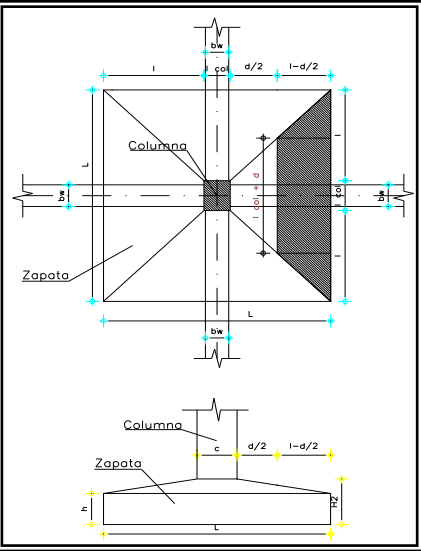
L =	2.00	m	H =	0.30	m
I =	0.75	m	h =	0.30	m
I - d =	0.52	m	H-h =	0.00	m

$$\begin{aligned} \mathbf{V(d)} &= 75.59 \text{ kN} \\ \mathbf{Vu(d)} &= 1.7 \cdot \mathbf{V(d)} \\ \mathbf{Vu(d)} &= 128.50 \text{ kN} \\ \mathbf{h'} &= 0.23 \text{ m} \end{aligned} \quad \begin{aligned} \mathbf{v_v} &= \frac{\mathbf{Vu}}{\mathbf{L \cdot h'}} = 0.279 \text{ MPa} \\ \mathbf{\phi v_c} &= 0.574 \text{ MPa} \quad \mathbf{OK} \end{aligned}$$

b. En dos direcciones ($d/2$)

L =	2.00	m	H =	0.30	m
d/2 =	0.12	m	h =	0.30	m
l - d/2 =	0.64	m	H-h =	0.00	m

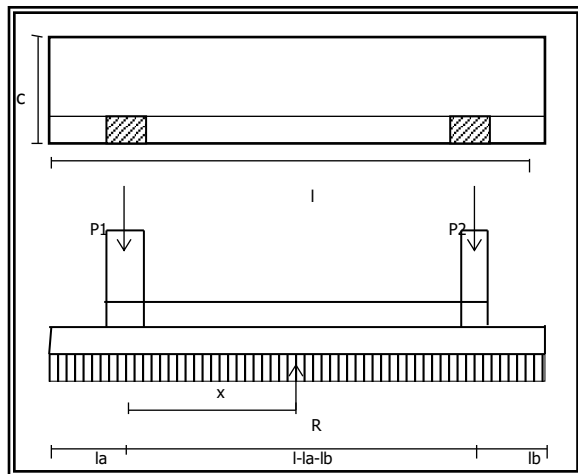
$$\begin{aligned}
 V(d/2) &= 61.6 \text{ kN} \\
 V_u(d/2) &= 1.5 * V(d) & v_u &= \frac{V_u}{b_o \times d_1} = 0.550 \text{ MPa} \\
 V_u(d/2) &= 92.3 \text{ kN} \\
 d_1 &= 0.23 \text{ m} \\
 \phi v_c &= 1.15 \text{ MPa} \quad \text{OK}
 \end{aligned}$$



DISEÑO DE ZAPATAS COMBINADAS
PROYECTO: INSTITUCION EDUCATIVA BARRIO OBRERO-RAMPA
ZAPATA TIPO 4 - Cantidad: 3

Columna	$b_1 = 40$ cm	$f'_c = 21.1$ MPa	$\sigma = 0.151$ MPa
	$t_1 = 40$ cm	$f_y = 420$ MPa	
	$b_2 = 50$ cm		
	$t_2 = 50$ cm		

PREDIMENSIONAMIENTO



$c = 1.50$ m	Cargas
$la = 1.05$ m	$Pu_1 = 328.0$ kN
$lb = 0.70$ m	$Pu_2 = 185.7$ kN
$I-la-lb = 1.25$ m	$Pp (15\%) = 77.05$ kN
$I = 3.00$ m	$\Sigma P = 590.74$ kN

$$\text{Area necesaria} = \frac{\Sigma P}{\sigma} = \frac{590.74}{0.151} = 3.91 \text{ m}^2$$

Centro de gravedad:	$X = 0.452$ m	$I = 3.00$ m
		$c = 1.30$ m

Asumimos	$I = 3.00$ m
	$c = 1.50$ m

$$\sigma_{\text{neto}} = 0.131 \text{ MPa OK}$$

DISEÑO VIGA DE ENLACE LONGITUDINAL, DE CONTRAPESO Y ZAPATA:

VIGA DE ENLACE LONGITUDINAL

Para el análisis de la viga de enlace longitudinal se tendrá en cuenta la longitud entre columnas, incluyendo la sollicitación que le imprime la zapata combinada.

Carga bajo el cimiento combinado:	$\sigma_{\text{neto}} * c = 196.9$ kN/m	$H = 0.50$ m
	$L = 1.25$ m	$d = 0.43$ m
		$bv = 0.40$ m

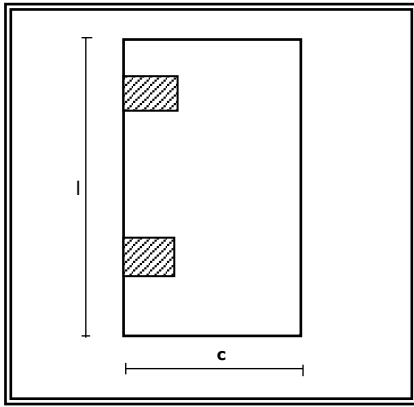
Cortantes en los apoyos:	Separación de flejes	Nº Ramas y flejes
$V_{1d} = 123.1$ kN	0.09 m	En toda la luz
$V_{1d} = -123.1$ kN	0.09 m	En toda la luz

Nota: En las partes intermedias a las distancias enunciadas los flejes se separan de acuerdo a lo enunciado en los planos estructurales.

Momento longitudinal:

Momento longitudinal:	Cuantía	As	Armadura
$M_{1/2L} = 38.5$ kN.m	0.0033	5.73 cm ²	3#6 arriba 3#4 Abajo

ZAPATA



M dir(x)			Datos	
$M = \sigma * l * (c - b_v)^2 / 2 =$	238.27	kN.m	$\sigma =$	0.131 MPa
$Mu = 1.5xM$	Mu_(x) = 357.40	kN.m	l =	3.00 m
Cuantia_(x) =	0.0020		c =	1.50 m
As_(x) =	31.80	cm ²	H =	0.60 m
A var =	1.29	cm ²	d =	0.53 m
s =	0.12	m	h =	0.30 m
No. var =	26			
Armadura_(x): 26#418c./0.12			Transversales	
M dir(y)				
$M = \sigma * c * (Máx(la:lb))^2 / 2 =$	108.17	kN.m		
$Mu = 1.5xM$	Mu_(y) = 162.25	kN.m		
Cuantia_(y) =	0.0020			
As_(y) =	15.90	cm ²		
A var =	1.29	cm ²		
s =	0.12	m		
No. var =	13			
Armadura_(y): 13#433c./0.12			Longitudinales	

Chequeo por cortante:

$$v_u = \frac{V_u}{b * d}$$

$$V_u \text{ dir}(x) = \sigma_{\text{neto}} * l * c = \boxed{433.21} \text{ kN}$$
$$V_u \text{ dir}(y) = \sigma_{\text{neto}} * c * [Máx(la, lb)] = \boxed{206.40} \text{ kN}$$

$$V_u = 1.50 * V_u \text{ dir}(x) = \boxed{649.82} \text{ kN}$$
$$V_u = 1.50 * V_u \text{ dir}(y) = \boxed{309.59} \text{ kN}$$

$$v_u \text{ dir}(x) = \boxed{0.409} \text{ MPa} \quad \text{OK}$$
$$v_u \text{ dir}(y) = \boxed{0.389} \text{ MPa} \quad \text{OK}$$
$$\phi v_c = \boxed{0.574} \text{ MPa}$$

Chequeo por transmisión de esfuerzos:

$$\sigma_b = \frac{1.7 * Máx(P_1: P_2)}{b * t}$$

$$\sigma_b = \boxed{3.485} \text{ MPa}$$
$$\phi \sigma_c = \boxed{22.16} \text{ MPa} \quad \text{OK}$$

DISEÑO DE VIGA DE CONTRAPESO:

Para el cálculo de la viga de contrapeso se supondrá que solamente recibe la sollicitación de una columna (la suma de todas las columnas que realmente la solicitan), dividiendo los efectos en las dos vigas de contrapeso.

Flexión

$$M_d = \Delta R(l - d) = 285.026 \text{ kN*m}$$
$$M_u = 1.5xM_d/2 = 213.77 \text{ kN*m}$$

$$H = \boxed{0.50} \text{ m}$$
$$d = 0.43 \text{ m}$$
$$b_v = \boxed{0.40} \text{ m}$$
$$\text{Cuantia} = 0.00755$$
$$As = 12.99 \text{ cm}^2$$
$$\text{Armadura} = \text{4\#7 Arriba}$$
$$\text{4\#4 Abajo}$$

Cortante

$$\text{Carga long. Bajo la zapata exterior} = 214.64 \text{ kN/m}$$
$$A_i = 42.93 \text{ kN}$$
$$A_d = 547.82 \text{ kN}$$
$$V_{\text{borde de columna}} = 547.82 \text{ kN}$$
$$V_{\text{diseño}} = 1.5xV_{\text{borde de columna}}/2 = 410.86 \text{ kN}$$

*INDICA SEGUNDA FILA

Estribos #3 SENCILLOS c/0.10 m en toda la luz

5. DISEÑO DE VIGAS, VIGUETAS Y COLUMNAS

*DISEÑO DE VIGAS, VIGUETAS Y
COLUMNAS*

PROYECTO: INSTITUCION EDUCATIVA BARRIO OBRERO-RAMPA

VR-7/ N+ 0.21

B= 0.40 H= 0.45 L= 0.50			B= 0.40 H= 0.45 L= 0.50		
Mu=-0.86 As=5.94 As(r)=5.23	Mu=-39.04 As=7.92 As(r)=5.23		Mu=-39.56 As=7.92 As(r)=5.23	Mu=-1.52 As=7.92 As(r)=5.23	
Mu=0.00 As=5.08 As(r)=5.23			Mu=0.00 As=5.08 As(r)=5.23		
Vu=45.01	Vu=48.15	Vu=51.29	Vu=-51.40	Vu=-48.21	Vu=-45.02

VR-8/ N+ 0.21

B= 0.15 H= 0.45 L= 0.55			B= 0.15 H= 0.45 L= 0.55		
Mu=-0.64 As=1.90 As(r)=1.96	Mu=-4.16 As=2.54 As(r)=1.96		Mu=-4.08 As=2.54 As(r)=1.96	Mu=-0.65 As=2.54 As(r)=1.96	
Mu=0.15 As=2.54 As(r)=1.96			Mu=0.11 As=2.54 As(r)=1.96		
Vu=3.09	Vu=4.65	Vu=6.21	Vu=-6.07	Vu=-4.48	Vu=-2.89

VR-10/ N+ 1.02

B= 0.15 H= 0.45 L= 0.55			B= 0.15 H= 0.45 L= 0.55		
Mu=-0.39 As=1.90 As(r)=1.96	Mu=-3.22 As=2.54 As(r)=1.96		Mu=-3.38 As=2.54 As(r)=1.96	Mu=-0.39 As=2.54 As(r)=1.96	
Mu=0.16 As=2.54 As(r)=1.96			Mu=0.14 As=2.54 As(r)=1.96		
Vu=2.40	Vu=3.96	Vu=5.52	Vu=-5.76	Vu=-4.17	Vu=-2.58

VR-11/ N+ 1.02

B= 0.15 H= 0.45 L= 0.55			B= 0.15 H= 0.45 L= 0.55		
Mu=-0.80 As=1.90 As(r)=1.96	Mu=-3.21 As=2.54 As(r)=1.96		Mu=-3.62 As=2.54 As(r)=1.96	Mu=-0.91 As=2.54 As(r)=1.96	
Mu=0.80 As=2.54 As(r)=1.96			Mu=0.91 As=2.54 As(r)=1.96		
Vu=-2.29	Vu=3.70	Vu=5.26	Vu=-5.87	Vu=-4.28	Vu=-2.69

PROYECTO: INSTITUCION EDUCATIVA BARRIO OBRERO-RAMPA

VR-9/ N+ 1.02

B= 0.40 H= 0.45 L= 0.55			B= 0.40 H= 0.45 L= 0.55		
Mu=-0.38 As=4.34 As(r)=5.23	Mu=-41.80 As=5.09 As(r)=5.23	Mu=-42.22 As=5.79 As(r)=5.23	Mu=-0.36 As=5.79 As(r)=5.23		
Mu=0.00 As=5.08 As(r)=5.23		Mu=0.00 As=5.08 As(r)=5.23			
Vu=-49.26	Vu=-51.39	Vu=-53.52	Vu=-53.46	Vu=-51.31	Vu=-49.16

VR-1/ N+ 1.83

B= 0.15 H= 0.45 L= 2.85			B= 0.15 H= 0.45 L= 1.22			B= 0.15 H= 0.45 L= 5.20		
Mu=-0.00 As=0.63 As(r)=1.96	Mu=-36.51 As=2.54 As(r)=2.57	Mu=-28.48 As=2.54 As(r)=1.98	Mu=-7.12 As=2.54 As(r)=1.96	Mu=-6.52 As=2.54 As(r)=1.96	Mu=-26.08 As=2.54 As(r)=1.96			
Mu=0.35 As=2.54 As(r)=1.96		Mu=7.12 As=2.54 As(r)=1.96		Mu=12.68 As=2.54 As(r)=1.96				
Vu=1.45	Vu=11.59	Vu=23.17	Vu=-21.76	Vu=-17.69	Vu=-13.75	Vu=-14.94	Vu=4.47	Vu=23.88

B= 0.15 H= 0.45 L= 3.75			B= 0.15 H= 0.45 L= 1.52			B= 0.15 H= 0.45 L= 1.83		
Mu=-28.33 As=2.54 As(r)=1.97	Mu=-7.08 As=2.54 As(r)=1.96	Mu=-3.47 As=2.54 As(r)=1.96	Mu=-3.47 As=2.54 As(r)=1.96	Mu=-8.38 As=2.54 As(r)=1.96	Mu=-33.52 As=2.54 As(r)=2.35			
Mu=7.08 As=2.54 As(r)=1.96		Mu=9.35 As=2.54 As(r)=1.96		Mu=8.38 As=2.54 As(r)=1.96				
Vu=-24.83	Vu=-10.44	Vu=4.10	Vu=5.56	Vu=9.50	Vu=13.43	Vu=12.92	Vu=19.49	Vu=26.06

B= 0.15 H= 0.45 L= 7.22			B= 0.15 H= 0.45 L= 0.55			B= 0.15 H= 0.45 L= 0.54		
Mu=-40.65 As=2.54 As(r)=2.88	Mu=-15.19 As=2.54 As(r)=1.96	Mu=-14.90 As=2.54 As(r)=1.96	Mu=-23.00 As=2.54 As(r)=1.96	Mu=-9.08 As=2.54 As(r)=1.96	Mu=-1.49 As=2.54 As(r)=1.96			
Mu=22.39 As=2.54 As(r)=1.96		Mu=5.75 As=2.54 As(r)=1.96		Mu=1.56 As=2.54 As(r)=1.96				
Vu=-30.64	Vu=-3.67	Vu=23.75	Vu=11.19	Vu=12.78	Vu=14.37	Vu=-12.01	Vu=-10.45	Vu=-8.89

VR-12/ N+ 1.83

B= 0.40 H= 0.45 L= 0.55			B= 0.40 H= 0.45 L= 0.55		
Mu=-0.76 As=3.81 As(r)=5.23	Mu=-49.08 As=5.08 As(r)=5.23	Mu=-48.23 As=5.08 As(r)=5.23	Mu=-0.58 As=5.08 As(r)=5.23		
Mu=0.00 As=5.08 As(r)=5.23		Mu=0.00 As=5.08 As(r)=5.23			
Vu=-57.94	Vu=-60.06	Vu=-62.19	Vu=-61.28	Vu=-59.13	Vu=-56.98

PROYECTO: INSTITUCION EDUCATIVA BARRIO OBRERO-RAMPA

VR-2/ N+ 1.83

B= 0.40 H= 0.45 L= 2.80			B= 0.40 H= 0.45 L= 1.17			B= 0.40 H= 0.45 L= 5.07		
Mu=-0.00 As=1.42 As(r)=5.23	Mu=-79.42 As=9.66 As(r)=5.53	Mu=-69.15 As=9.66 As(r)=5.23	Mu=-17.29 As=9.66 As(r)=5.23	Mu=-15.20 As=9.66 As(r)=5.23	Mu=-60.79 As=9.66 As(r)=5.23			
Mu=0.37 As=6.50 As(r)=5.23			Mu=17.29 As=6.50 As(r)=5.23			Mu=30.39 As=6.50 As(r)=5.23		
Vu=2.22	Vu=25.21	Vu=50.42	Vu=-57.82	Vu=-49.19	Vu=-41.41	Vu=-30.24	Vu=11.99	Vu=54.21

B= 0.40 H= 0.45 L= 3.63			B= 0.40 H= 0.45 L= 1.52			B= 0.40 H= 0.45 L= 1.71		
Mu=-75.96 As=9.66 As(r)=5.28	Mu=-18.99 As=9.66 As(r)=5.23	Mu=-9.85 As=8.67 As(r)=5.23	Mu=-9.85 As=11.40 As(r)=5.23	Mu=-21.37 As=11.40 As(r)=5.23	Mu=-85.48 As=9.66 As(r)=5.98			
Mu=18.99 As=6.50 As(r)=5.23			Mu=28.40 As=6.50 As(r)=5.23			Mu=21.37 As=6.50 As(r)=5.23		
Vu=-60.78	Vu=-29.47	Vu=2.75	Vu=15.17	Vu=24.09	Vu=33.01	Vu=37.64	Vu=51.93	Vu=66.22

B= 0.40 H= 0.45 L= 7.09			B= 0.40 H= 0.45 L= 0.50			B= 0.40 H= 0.45 L= 0.49		
Mu=-99.57 As=9.66 As(r)=7.02	Mu=-24.89 As=9.66 As(r)=5.23	Mu=-26.45 As=9.66 As(r)=5.23	Mu=-105.81 As=9.66 As(r)=7.48	Mu=-17.91 As=9.66 As(r)=5.23	Mu=-0.19 As=9.66 As(r)=5.23			
Mu=49.78 As=6.50 As(r)=5.23			Mu=26.45 As=6.50 As(r)=5.23			Mu=3.41 As=6.50 As(r)=5.23		
Vu=-69.83	Vu=-11.03	Vu=48.50	Vu=96.59	Vu=100.31	Vu=104.02	Vu=-25.83	Vu=-22.17	Vu=-18.52

VR-3/ N+ 1.83

B= 0.15 H= 0.45 L= 2.85			B= 0.15 H= 0.45 L= 1.22			B= 0.15 H= 0.45 L= 5.20		
Mu=-0.00 As=0.63 As(r)=1.96	Mu=-36.51 As=2.54 As(r)=2.57	Mu=-28.46 As=2.54 As(r)=1.98	Mu=-7.11 As=2.54 As(r)=1.96	Mu=-6.53 As=2.54 As(r)=1.96	Mu=-26.12 As=2.54 As(r)=1.96			
Mu=0.32 As=2.54 As(r)=1.96			Mu=7.11 As=2.54 As(r)=1.96			Mu=12.68 As=2.54 As(r)=1.96		
Vu=1.40	Vu=11.59	Vu=23.17	Vu=-21.76	Vu=-17.70	Vu=-13.83	Vu=-14.93	Vu=4.48	Vu=23.89

B= 0.15 H= 0.45 L= 3.75			B= 0.15 H= 0.45 L= 1.52			B= 0.15 H= 0.45 L= 1.83		
Mu=-28.44 As=2.54 As(r)=1.98	Mu=-7.11 As=2.54 As(r)=1.96	Mu=-3.55 As=2.54 As(r)=1.96	Mu=-3.55 As=2.54 As(r)=1.96	Mu=-8.53 As=2.54 As(r)=1.96	Mu=-34.13 As=2.54 As(r)=2.39			
Mu=14.22 As=2.54 As(r)=1.96			Mu=9.31 As=2.54 As(r)=1.96			Mu=8.53 As=2.54 As(r)=1.96		
Vu=-24.85	Vu=-10.46	Vu=4.11	Vu=6.23	Vu=10.14	Vu=14.06	Vu=13.25	Vu=19.82	Vu=26.39

PROYECTO: INSTITUCION EDUCATIVA BARRIO OBRERO-RAMPA

B= 0.15 H= 0.45 L= 7.22			B= 0.15 H= 0.45 L= 0.55			B= 0.15 H= 0.45 L= 0.54		
Mu=-43.18 As=2.54 As(r)=3.07	Mu=-14.37 As=2.54 As(r)=1.96		Mu=-12.69 As=2.54 As(r)=1.96	Mu=-31.71 As=2.54 As(r)=2.22		Mu=-19.75 As=2.54 As(r)=1.96	Mu=-0.98 As=2.54 As(r)=1.96	
Mu=22.38 As=2.54 As(r)=1.96			Mu=7.93 As=2.54 As(r)=1.96			Mu=0.00 As=2.54 As(r)=1.96		
Vu=-31.32	Vu=-4.36	Vu=23.07	Vu=23.92	Vu=25.51	Vu=27.10	Vu=-26.14	Vu=-24.58	Vu=-23.01

VR-13/ N+ 2.64

B= 0.40 H= 0.45 L= 0.55			B= 0.40 H= 0.45 L= 0.54		
Mu=-1.23 As=5.79 As(r)=5.23	Mu=-43.92 As=5.79 As(r)=5.23		Mu=-41.37 As=5.79 As(r)=5.23	Mu=-0.85 As=5.79 As(r)=5.23	
Mu=0.00 As=5.08 As(r)=5.23			Mu=0.00 As=5.08 As(r)=5.23		
Vu=50.57	Vu=52.72	Vu=54.87	Vu=-53.34	Vu=-51.21	Vu=-49.09

VR-14/ N+ 2.64

B= 0.15 H= 0.45 L= 0.55			B= 0.15 H= 0.45 L= 0.54		
Mu=-1.20 As=2.54 As(r)=1.96	Mu=-6.00 As=2.54 As(r)=1.96		Mu=-5.70 As=2.54 As(r)=1.96	Mu=-1.16 As=2.54 As(r)=1.96	
Mu=2.22 As=2.54 As(r)=1.96			Mu=2.10 As=2.54 As(r)=1.96		
Vu=-8.04	Vu=7.66	Vu=9.24	Vu=-8.92	Vu=-7.36	Vu=7.65

VR-15/ N+ 2.64

B= 0.15 H= 0.45 L= 0.55			B= 0.15 H= 0.45 L= 0.54		
Mu=-1.01 As=2.54 As(r)=1.96	Mu=-5.29 As=2.54 As(r)=1.96		Mu=-5.32 As=2.54 As(r)=1.96	Mu=-1.00 As=2.54 As(r)=1.96	
Mu=1.37 As=2.54 As(r)=1.96			Mu=1.40 As=2.54 As(r)=1.96		
Vu=-5.25	Vu=6.55	Vu=8.14	Vu=-8.24	Vu=-6.68	Vu=5.38

VR-16/ N+ 3.45

B= 0.40 H= 0.45 L= 0.55			B= 0.40 H= 0.45 L= 0.54		
Mu=-3.48 As=5.30 As(r)=5.23	Mu=-43.37 As=5.79 As(r)=5.23		Mu=-42.67 As=5.79 As(r)=5.23	Mu=-3.47 As=5.79 As(r)=5.23	
Mu=0.00 As=5.08 As(r)=5.23			Mu=0.00 As=5.08 As(r)=5.23		
Vu=50.67	Vu=52.83	Vu=54.98	Vu=-54.76	Vu=-52.63	Vu=-50.51

PROYECTO: INSTITUCION EDUCATIVA BARRIO OBRERO-RAMPA

VR-17/ N+ 3.45

B= 0.40 H= 0.45 L= 0.50			B= 0.40 H= 0.45 L= 0.49		
Mu=-2.75 As=5.79 As(r)=5.23	Mu=-44.26 As=5.79 As(r)=5.23		Mu=-43.63 As=5.79 As(r)=5.23	Mu=-2.75 As=5.79 As(r)=5.23	
Mu=2.18 As=5.08 As(r)=5.23			Mu=2.20 As=5.08 As(r)=5.23		
Vu=47.41	Vu=50.34	Vu=53.28	Vu=-53.07	Vu=-50.18	Vu=-47.30

VR-18/ N+ 3.45

B= 0.15 H= 0.45 L= 0.55			B= 0.15 H= 0.45 L= 0.54		
Mu=-0.85 As=2.54 As(r)=1.96	Mu=-1.45 As=2.54 As(r)=1.96		Mu=-1.43 As=2.54 As(r)=1.96	Mu=-0.84 As=2.54 As(r)=1.96	
Mu=1.18 As=2.54 As(r)=1.96			Mu=1.18 As=2.54 As(r)=1.96		
Vu=-5.21	Vu=-3.62	Vu=2.97	Vu=-2.91	Vu=3.65	Vu=5.21

VR-4/ N+ 3.45

B= 0.15 H= 0.45 L= 1.50			B= 0.15 H= 0.45 L= 7.17			B= 0.15 H= 0.45 L= 1.90		
Mu=-0.30 As=2.97 As(r)=1.96	Mu=-17.16 As=3.96 As(r)=1.96		Mu=-38.28 As=3.96 As(r)=2.70	Mu=-42.42 As=3.96 As(r)=3.01		Mu=-30.84 As=3.96 As(r)=2.15	Mu=-7.71 As=3.96 As(r)=1.96	
Mu=0.26 As=2.54 As(r)=1.96			Mu=20.87 As=2.54 As(r)=1.96			Mu=7.71 As=2.54 As(r)=1.96		
Vu=5.21	Vu=9.52	Vu=13.82	Vu=26.70	Vu=-4.75	Vu=-28.28	Vu=23.76	Vu=18.09	Vu=12.42

B= 0.15 H= 0.45 L= 1.50			B= 0.15 H= 0.45 L= 2.50			B= 0.15 H= 0.45 L= 6.41		
Mu=-5.67 As=3.96 As(r)=1.96	Mu=-3.14 As=3.96 As(r)=1.96		Mu=-6.95 As=3.96 As(r)=1.96	Mu=-27.82 As=3.96 As(r)=1.96		Mu=-42.99 As=3.96 As(r)=3.06	Mu=-21.19 As=3.96 As(r)=1.96	
Mu=7.48 As=2.54 As(r)=1.96			Mu=6.95 As=2.54 As(r)=1.96			Mu=21.49 As=2.54 As(r)=1.96		
Vu=-14.32	Vu=-10.39	Vu=9.33	Vu=-4.98	Vu=-12.96	Vu=-22.10	Vu=28.55	Vu=8.52	Vu=-20.63

B= 0.15 H= 0.45 L= 0.55			B= 0.15 H= 0.45 L= 0.55		
Mu=-20.73 As=3.96 As(r)=1.96	Mu=-36.90 As=3.96 As(r)=2.60		Mu=-20.47 As=3.96 As(r)=1.96	Mu=-0.36 As=3.96 As(r)=1.96	
Mu=10.95 As=2.54 As(r)=1.96			Mu=0.34 As=2.54 As(r)=1.96		
Vu=26.96	Vu=28.52	Vu=30.08	Vu=-26.48	Vu=-24.89	Vu=-23.30

PROYECTO: INSTITUCION EDUCATIVA BARRIO OBRERO-RAMPA

VR-5/ N+ 3.45

B= 0.40 H= 0.45 L= 1.45			B= 0.40 H= 0.45 L= 7.00			B= 0.40 H= 0.45 L= 1.77		
Mu=-0.18 As=7.24 As(r)=5.23	Mu=-24.36 As=9.66 As(r)=5.23	Mu=-88.02 As=9.66 As(r)=6.16	Mu=-94.88 As=9.66 As(r)=6.67	Mu=-99.65 As=9.66 As(r)=7.02	Mu=-24.91 As=9.66 As(r)=5.23			
Mu=0.00 As=6.50 As(r)=5.23			Mu=43.70 As=6.50 As(r)=5.23			Mu=24.91 As=6.50 As(r)=5.23		
Vu=4.17	Vu=13.92	Vu=23.66	Vu=58.36	Vu=-10.43	Vu=-61.25	Vu=64.77	Vu=52.21	Vu=39.66

B= 0.40 H= 0.45 L= 1.50			B= 0.40 H= 0.45 L= 2.37			B= 0.40 H= 0.45 L= 6.28		
Mu=-6.79 As=9.66 As(r)=5.23	Mu=-6.78 As=9.66 As(r)=5.23	Mu=-21.96 As=9.66 As(r)=5.23	Mu=-87.83 As=9.66 As(r)=6.15	Mu=-117.95 As=9.66 As(r)=8.40	Mu=-55.03 As=9.66 As(r)=5.23			
Mu=21.35 As=6.50 As(r)=5.23			Mu=23.30 As=6.50 As(r)=5.23			Mu=41.73 As=6.50 As(r)=5.23		
Vu=-26.86	Vu=-17.94	Vu=15.64	Vu=-20.03	Vu=-37.70	Vu=-55.36	Vu=68.45	Vu=25.01	Vu=-49.16

B= 0.40 H= 0.45 L= 0.50			B= 0.40 H= 0.45 L= 0.50		
Mu=-55.14 As=9.66 As(r)=5.23	Mu=-143.27 As=9.66 As(r)=10.37	Mu=-24.62 As=9.66 As(r)=5.23	Mu=-0.23 As=3.96 As(r)=5.23		
Mu=44.88 As=6.50 As(r)=5.23			Mu=4.27 As=6.50 As(r)=5.23		
Vu=105.94	Vu=109.60	Vu=113.25	Vu=-33.52	Vu=-29.80	Vu=-26.09

VR-6/ N+ 3.45

B= 0.15 H= 0.45 L= 1.50			B= 0.15 H= 0.45 L= 7.17			B= 0.15 H= 0.45 L= 1.90		
Mu=-0.30 As=2.97 As(r)=1.96	Mu=-17.11 As=3.96 As(r)=1.96	Mu=-38.22 As=3.96 As(r)=2.70	Mu=-42.43 As=3.96 As(r)=3.01	Mu=-30.29 As=3.96 As(r)=2.11	Mu=-7.57 As=3.96 As(r)=1.96			
Mu=0.26 As=2.54 As(r)=1.96			Mu=20.87 As=2.54 As(r)=1.96			Mu=7.57 As=2.54 As(r)=1.96		
Vu=5.21	Vu=9.49	Vu=13.78	Vu=26.69	Vu=-4.75	Vu=-28.29	Vu=23.62	Vu=17.95	Vu=12.28

B= 0.15 H= 0.45 L= 1.50			B= 0.15 H= 0.45 L= 2.50			B= 0.15 H= 0.45 L= 6.41		
Mu=-5.70 As=3.96 As(r)=1.96	Mu=-3.14 As=3.96 As(r)=1.96	Mu=-6.73 As=3.96 As(r)=1.96	Mu=-26.90 As=3.96 As(r)=1.96	Mu=-40.53 As=3.96 As(r)=2.87	Mu=-24.13 As=3.96 As(r)=1.96			
Mu=7.43 As=2.54 As(r)=1.96			Mu=6.73 As=2.54 As(r)=1.96			Mu=20.26 As=2.54 As(r)=1.96		
Vu=-14.30	Vu=-10.38	Vu=9.53	Vu=-4.62	Vu=-12.60	Vu=-21.75	Vu=27.49	Vu=7.68	Vu=-21.53

PROYECTO: INSTITUCION EDUCATIVA BARRIO OBRERO-RAMPA

B= 0.15 H= 0.45 L= 0.55			B= 0.15 H= 0.45 L= 0.55		
Mu=-23.82 As=3.96 As(r)=1.96			Mu=-28.95 As=3.96 As(r)=2.01		
Mu=13.50 As=2.54 As(r)=1.96			Mu=2.90 As=2.54 As(r)=1.96		
Vu=10.26	Vu=11.82	Vu=13.38	Vu=-8.72	Vu=7.30	Vu=8.89

PROYECTO: INSTITUCION EDUCATIVA BARRIO OBRERO-RAMPA**Columna B'-1'**

Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuántia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+0.21	.10	.45 1.00	.50	.50	-39.32 -51.80	-4.19 -15.79	-190.36	179.68	76.21	16/#5 #4 (1.0%) 16/#5 #4 (1.0%)	0.17 0.23	.83	1.40

Columna C-1'

Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuántia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+1.02	.97	.10 1.00	.50	.50	25.69 -78.26	5.21 -23.88	-190.31	158.43	62.94	16/#5 #4 (1.0%) 16/#5 #4 (1.0%)	0.11 0.35		

Columna D-1'

Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuántia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+1.83	1.78	.10 1.00	.50	.50	57.31 -78.27	10.25 -151.59	-222.18	119.78	141.25	16/#5 #4 (1.0%) 16/#5 #4 (1.0%)	0.25 0.77		

Columna E'-1'

Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuántia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+1.83	1.43	.45 1.00	.50	.50	-113.55 70.05	-181.49 296.13	-246.84	123.70	255.20	20/#6 #5 (2.0%) 20/#6 #5 (2.0%)	0.65 0.84	1.42	1.42

PROYECTO: INSTITUCION EDUCATIVA BARRIO OBRERO-RAMPA**Columna E'-1**

Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuántia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+2.64	2.59	.10	.50	.50	10.89	163.30	-195.81	152.14	174.03	20/#6 #5 (2.0%)	0.43		
		1.00			-333.71	-82.65				20/#6 #5 (2.0%)	0.96		

Columna E'-2

Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuántia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+3.45	3.40	.10	.50	.50	-59.25	-54.46	-214.24	172.52	110.65	20/#7 #6 (2.8%)	0.33		
		1.00			-440.08	-55.61				20/#7 #6 (2.8%)	0.95		

Columna E'-3'

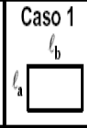
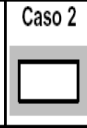
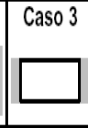
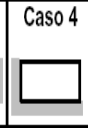
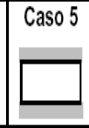
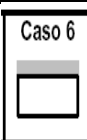



Nivel	H Libre	Losa	B	H	M1	M2	P	V1	V2	Cuántia	m/mr	Col/Vig Eje ppal	Col/vig Eje sec
N+3.45	3.05	.45	.50	.50	61.56	42.83	-81.77	218.28	74.52	20/#6 #7 (2.6%)	0.67	3.48	1.71
		1.00			-688.64	-52.44				20/#6 #7 (2.6%)	1.55		

6. DISEÑO DE ELEMENTOS COMPLEMENTARIOS

*DISEÑO DE ELEMENTOS
COMPLEMENTARIOS*

PROYECTO: INSTITUCION EDUCATIVA BARRIO OBRERO - RAMPA DISEÑO PLACA MACIZA (EN UNA DIRECCION)

El diseño de la placa maciza se realiza de acuerdo con lo establecido en C.13.9 de las NSR - 10

Caso 1	Caso 2	Caso 3	Caso 4	Caso 5
				
Caso 6	Caso 7	Caso 8	Caso 9	
				

Geometría de la losa

$$l_a = 1.50 \text{ m} \quad f_y = 420 \text{ MPa}$$

$$l_b = 7.10 \text{ m} \quad f'_c = 21 \text{ MPa}$$

$$\text{Relación } m = 0.211$$

$$h = l/20 (0.4 + f_y/700) = 0.08 \text{ m}$$

$$\text{Espesor escogido: } 0.10 \text{ m}$$

Teniendo en cuenta que la relación m es menor de 0.5, la placa maciza trabaja en una dirección

Cargas

Peso propio de la losa	0.1x1.0x24	2.40	kN/m ²
Impermeabilización	0.05x20	1.00	kN/m ²
Carga Muerta Total		3.40	kN/m²
Carga Viva		5.00	kN/m²
Carga Última		12.08	kN/m²

DISEÑO A MOMENTO FLECTOR

$$M_u = 3.40 \text{ kN.m}$$

$$\text{Cuantía: } 0.0020 \quad A_s = 2.00 \text{ cm}^2/\text{m} \quad \text{Transversal}$$

$$\text{Cuantía: } 0.0018 \quad A_s = 1.80 \text{ cm}^2/\text{m} \quad \text{Longitudinal}$$

Distribución de refuerzo:

Colocar 1#3 c/.20 Transversalmente superior e inferior
Colocar 1#3 c/.20 Longitudinalmente superior e inferior

REVISIÓN A CORTANTE

$$R = 9.06 \text{ kN}$$

$$\phi_v C = 0.573 \text{ MPa}$$

$$\phi_v U = 0.129 \text{ MPa} \quad \text{OK}$$

8. ANEXOS DE COMPUTADOR

ANEXOS DE COMPUTADOR

ETABS v9.7.4 File:MODELO RAMPA Units:KN-m Octubre 5, 2016 15:07 PAGE 1

S T O R Y D A T A

STORY	SIMILAR TO	HEIGHT	ELEVATION
N+3.45	None	0.810	3.450
N+2.64	None	0.810	2.640
N+1.83	None	0.810	1.830
N+1.02	None	0.810	1.020
N+0.21	None	0.260	0.210
BASE	None		-0.050

ETABS v9.7.4 File:MODELO RAMPA Units:KN-m Octubre 5, 2016 15:07 PAGE 2

P O I N T C O O R D I N A T E S

POINT	X	Y	DZ-BELOW
1	0.000	20.950	0.000
2	6.730	20.950	0.000
3	14.060	20.950	0.000
4	22.260	20.950	0.000
5	22.260	13.625	0.000
6	22.260	7.450	0.000
7	22.260	0.000	0.000
8	0.000	20.130	0.000
9	0.000	21.780	0.000
10	1.470	20.130	0.000
11	1.470	20.950	0.000
12	1.470	21.780	0.000
15	12.280	20.130	0.000
16	12.280	20.950	0.000
17	12.280	21.780	0.000
18	10.630	20.130	0.000
19	10.630	20.950	0.000
20	10.630	21.780	0.000
21	22.260	21.780	0.000
22	22.260	20.130	0.000
23	21.430	20.130	0.000
24	21.430	20.950	0.000
25	21.430	21.780	0.000
26	23.080	20.130	0.000
27	23.080	20.950	0.000
28	23.080	21.780	0.000
31	21.430	9.330	0.000
32	23.080	9.330	0.000
33	22.260	9.330	0.000
34	21.430	10.980	0.000
35	23.080	10.980	0.000
36	22.260	10.980	0.000
37	21.430	0.000	0.000
38	23.080	0.000	0.000
39	21.430	-1.780	0.000
40	23.080	-1.780	0.000
41	22.260	-1.780	0.000
2-1	6.730	20.950	0.345
3-1	14.060	20.950	0.652
5-1	22.260	13.625	0.234
6-1	22.260	7.450	0.647
42	6.730	20.130	0.000
43	6.730	21.780	0.000
43-1	6.730	21.780	0.345
42-1	6.730	20.130	0.345
44	14.060	20.130	0.000
44-1	14.060	20.130	0.652
45	14.060	21.780	0.000
45-1	14.060	21.780	0.652
46	21.430	13.625	0.000
46-1	21.430	13.625	0.234
47	23.080	13.625	0.000
47-1	23.080	13.625	0.234
48	21.430	7.450	0.000
48-1	21.430	7.450	0.647
49	23.080	7.450	0.000

49-1	23.080	7.450	0.647
50	-3.140	20.130	0.000
51	-3.140	21.780	0.000
52	-3.140	20.950	0.000

ETABS v9.7.4 File:MODELO RAMPA Units:KN-m Octubre 5, 2016 15:07 PAGE 3

C O L U M N C O N N E C T I V I T Y D A T A

COLUMN	I END PT	J END PT	I END STORY
C1	1	1	Below
C2	2	2	Below
C3	3	3	Below
C4	4	4	Below
C5	5	5	Below
C6	6	6	Below
C7	7	7	Below
C2-1	2	2-1	Below
C3-1	3	3-1	Below
C5-1	5	5-1	Below
C6-1	6	6-1	Below

ETABS v9.7.4 File:MODELO RAMPA Units:KN-m Octubre 5, 2016 15:07 PAGE 4

B E A M C O N N E C T I V I T Y D A T A

BEAM	I END PT	J END PT
B2	8	1
B3	1	9
B4	10	11
B5	11	12
B6	1	11
B7	8	10
B8	9	12
B13	15	16
B14	16	17
B15	18	19
B16	19	20
B17	20	17
B18	18	15
B20	19	16
B26	23	24
B27	24	25
B28	23	22
B29	22	26
B30	26	27
B31	27	28
B32	21	28
B33	25	21
B34	24	4
B35	4	27
B36	22	4
B37	4	21
B40	31	33
B41	33	32
B42	34	36
B43	36	35
B44	33	36
B45	31	34
B46	32	35
B47	37	7
B48	7	38
B49	39	41
B50	41	40
B51	41	7
B52	39	37
B53	40	38
B56	2-1	43-1
B57	2-1	42-1
B58	3-1	44-1
B59	3-1	45-1
B60	46-1	5-1
B61	5-1	47-1
B62	48-1	6-1
B63	6-1	49-1

ETABS v9.7.4 File:MODELO RAMPA Units:KN-m Octubre 5, 2016 15:07 PAGE 5

B R A C E C O N N E C T I V I T Y D A T A

BRACE	I END PT	J END PT	I END STORY
D2	11	2-1	Below
D3	2-1	19	Same
D5	16	3-1	Below
D6	3-1	24	Same
D8	22	5-1	Below
D9	5-1	36	Same
D11	33	6-1	Below
D12	6-1	7	Same
D22	10	42-1	Below
D23	42-1	18	Same
D24	12	43-1	Below
D25	43-1	20	Same
D26	15	44-1	Below
D27	44-1	23	Same
D28	17	45-1	Below
D29	45-1	25	Same
D30	23	46-1	Below
D31	46-1	34	Same
D32	26	47-1	Below
D33	47-1	35	Same
D34	31	48-1	Below
D35	48-1	37	Same
D36	32	49-1	Below
D37	49-1	38	Same
D38	52	1	Below
D39	50	8	Below
D40	51	9	Below

ETABS v9.7.4 File:MODELO RAMPA Units:KN-m Octubre 5, 2016 15:07 PAGE 6

R I G I D D I A P H R A G M P O I N T C O N N E C T I V I T Y D A T A

STORY	DIAPHRAGM	POINT	POINT	POINT	POINT	POINT
N+3.45	D1	7 41	37	38	39	40
N+2.64	D1	31 36	32	33	34	35
N+1.83	D1	4 26	23 27	24 28	25 21	22
N+1.02	D1	15 20	16	17	18	19
N+0.21	D1	1 12	8	9	10	11

ETABS v9.7.4 File:MODELO RAMPA Units:KN-m Octubre 5, 2016 15:07 PAGE 7

M A T E R I A L P R O P E R T Y D A T A

MATERIAL NAME	MATERIAL TYPE	DESIGN TYPE	MATERIAL DIR/PLANE	MODULUS OF ELASTICITY	POISSON'S RATIO	THERMAL COEFF	SHEAR MODULUS
STEEL	Iso	Steel	All	199947978.80	0.3000	1.1700E-05	76903068.77
CONC21	Iso	Concrete	All	21538105.766	0.2000	9.9000E-06	8974210.736
RAMPA	Iso	Concrete	All	0.010	0.2000	9.9000E-06	0.004

M A T E R I A L P R O P E R T Y M A S S A N D W E I G H T

MATERIAL NAME	MASS PER UNIT VOL	WEIGHT PER UNIT VOL
STEEL	7.8271E+00	7.6820E+01
CONC21	2.4000E+00	2.4000E+01
RAMPA	2.4000E+00	0.0000E+00



M A T E R I A L D E S I G N D A T A F O R S T E E L M A T E R I A L S

MATERIAL NAME	STEEL FY	STEEL FU	STEEL COST (\$)
STEEL	344737.894	448159.263	271447.16

M A T E R I A L D E S I G N D A T A F O R C O N C R E T E M A T E R I A L S

MATERIAL NAME	LIGHTWEIGHT CONCRETE	CONCRETE FC	REBAR FY	REBAR FYS	LIGHTWT REDUC FACT
CONC21	No	21000.000	420000.000	420000.000	N/A
RAMPA	No	21000.000	420000.000	420000.000	N/A

ETABS v9.7.4 File:MODELO RAMPA Units:KN-m Octubre 5, 2016 15:07 PAGE 8

F R A M E S E C T I O N P R O P E R T Y D A T A

FRAME SECTION NAME	MATERIAL NAME	SECTION SHAPE NAME OR NAME IN SECTION DATABASE FILE	CONC COL	CONC BEAM
COL50X50	CONC21	Rectangular	Yes	
VIG40X45	CONC21	Rectangular		Yes
VIG15X45	CONC21	Rectangular		Yes

F R A M E S E C T I O N P R O P E R T Y D A T A

FRAME SECTION NAME	SECTION DEPTH	FLANGE WIDTH TOP	FLANGE THICK TOP	WEB THICK	FLANGE WIDTH BOT	FLANGE THICK BOT
COL50X50	0.5000	0.5000	0.0000	0.0000	0.0000	0.0000
VIG40X45	0.4500	0.4000	0.0000	0.0000	0.0000	0.0000
VIG15X45	0.4500	0.1500	0.0000	0.0000	0.0000	0.0000

F R A M E S E C T I O N P R O P E R T Y D A T A

FRAME SECTION NAME	SECTION AREA	TORSIONAL CONSTANT	MOMENTS OF INERTIA I33	I22	SHEAR AREAS A2	A3
COL50X50	0.2500	0.0088	0.0052	0.0052	0.2083	0.2083
VIG40X45	0.1800	0.0045	0.0030	0.0024	0.1500	0.1500
VIG15X45	0.0675	0.0004	0.0011	0.0001	0.0563	0.0563

F R A M E S E C T I O N P R O P E R T Y D A T A

FRAME SECTION NAME	SECTION MODULI S33	S22	PLASTIC MODULI Z33	Z22	RADIUS OF GYRATION R33	R22
COL50X50	0.0208	0.0208	0.0313	0.0313	0.1443	0.1443
VIG40X45	0.0135	0.0120	0.0203	0.0180	0.1299	0.1155
VIG15X45	0.0051	0.0017	0.0076	0.0025	0.1299	0.0433

F R A M E S E C T I O N W E I G H T S A N D M A S S E S

FRAME SECTION NAME	TOTAL WEIGHT	TOTAL MASS
COL50X50	77.4106	7.7411
VIG40X45	258.4792	25.8479
VIG15X45	177.8214	17.7821

C O N C R E T E C O L U M N D A T A

FRAME SECTION NAME	REINF CONFIGURATION LONGIT LATERAL	REINF SIZE/TYPE	NUM BARS 3DIR/2DIR	NUM BARS CIRCULAR	BAR COVER
COL50X50	Rectangular Ties	#9/Design	3/3	N/A	0.0500



C O N C R E T E B E A M D A T A

FRAME SECTION NAME	TOP COVER	BOT COVER	TOP LEFT AREA	TOP RIGHT AREA	BOT LEFT AREA	BOT RIGHT AREA
VIG40X45	0.0500	0.0500	0.000	0.000	0.000	0.000
VIG15X45	0.0500	0.0500	0.000	0.000	0.000	0.000

ETABS v9.7.4 File:MODELO RAMPA Units:KN-m Octubre 5, 2016 15:07 PAGE 9

S H E L L S E C T I O N P R O P E R T Y D A T A

SHELL SECTION	MATERIAL NAME	SHELL TYPE	LOAD DIST ONE WAY	MEMBRANE THICK	BENDING THICK	TOTAL WEIGHT	TOTAL MASS
RAMPA	RAMPA	Membrane	No	0.1420	0.1420	0.0000	22.5396
DESCANSO	CONC21	Membrane	No	0.1420	0.1420	46.1102	4.6110

ETABS v9.7.4 File:MODELO RAMPA Units:KN-m Octubre 5, 2016 15:07 PAGE 10

S T A T I C L O A D C A S E S

STATIC CASE	CASE TYPE	AUTO LAT LOAD	SELF WT MULTIPLIER	NOTIONAL FACTOR	NOTIONAL DIRECTION
DEAD	DEAD	N/A	1.0000		
LIVE	LIVE	N/A	0.0000		

ETABS v9.7.4 File:MODELO RAMPA Units:KN-m Octubre 5, 2016 15:07 PAGE 11

R E S P O N S E S P E C T R U M C A S E S

RESP SPEC CASE: SISDISX

BASIC RESPONSE SPECTRUM DATA

MODAL COMBO	DIRECTION COMBO	MODAL DAMPING	SPECTRUM ANGLE	TYPICAL ECCEN
SRSS	SRSS	0.0500	0.0000	0.0500

RESPONSE SPECTRUM FUNCTION ASSIGNMENT DATA

DIRECTION	FUNCTION	SCALE FACT
U1	DISENO	25.8180
U2	----	N/A
UZ	----	N/A

RESP SPEC CASE: SISDISY

BASIC RESPONSE SPECTRUM DATA

MODAL COMBO	DIRECTION COMBO	MODAL DAMPING	SPECTRUM ANGLE	TYPICAL ECCEN
SRSS	SRSS	0.0500	0.0000	0.0500

RESPONSE SPECTRUM FUNCTION ASSIGNMENT DATA

DIRECTION	FUNCTION	SCALE FACT
U1	----	N/A
U2	DISENO	15.5590
UZ	----	N/A

RESP SPEC CASE: SISDERX

BASIC RESPONSE SPECTRUM DATA

MODAL COMBO	DIRECTION COMBO	MODAL DAMPING	SPECTRUM ANGLE	TYPICAL ECCEN
SRSS	SRSS	0.0500	0.0000	0.0500

RESPONSE SPECTRUM FUNCTION ASSIGNMENT DATA

DIRECTION	FUNCTION	SCALE FACT
U1	DERIVAS	25.8180
U2	----	N/A
UZ	----	N/A

RESP SPEC CASE: SISDERY

BASIC RESPONSE SPECTRUM DATA

MODAL COMBO	DIRECTION COMBO	MODAL DAMPING	SPECTRUM ANGLE	TYPICAL ECCEN
SRSS	SRSS	0.0500	0.0000	0.0500

RESPONSE SPECTRUM FUNCTION ASSIGNMENT DATA

DIRECTION	FUNCTION	SCALE FACT
U1	----	N/A
U2	DERIVAS	15.5590
UZ	----	N/A

RESP SPEC CASE: SISUMBX

BASIC RESPONSE SPECTRUM DATA

MODAL COMBO	DIRECTION COMBO	MODAL DAMPING	SPECTRUM ANGLE	TYPICAL ECCEN
SRSS	SRSS	0.0200	0.0000	0.0500

RESPONSE SPECTRUM FUNCTION ASSIGNMENT DATA

DIRECTION	FUNCTION	SCALE FACT
U1	UMBRAL	44.0480
U2	----	N/A
UZ	----	N/A

RESP SPEC CASE: SISUMBY

BASIC RESPONSE SPECTRUM DATA

MODAL COMBO	DIRECTION COMBO	MODAL DAMPING	SPECTRUM ANGLE	TYPICAL ECCEN
SRSS	SRSS	0.0200	0.0000	0.0500

RESPONSE SPECTRUM FUNCTION ASSIGNMENT DATA

DIRECTION	FUNCTION	SCALE FACT
U1	----	N/A
U2	UMBRAL	29.9930
UZ	----	N/A

ETABS v9.7.4 File:MODELO RAMPA Units:KN-m Octubre 5, 2016 15:07 PAGE 12

LOADING COMBINATIONS

COMBO	COMBO TYPE	CASE	CASE TYPE	SCALE FACTOR
COMDER1	ADD	SISDERX	Spectra	1.0000
		SISDERY	Spectra	0.3000
COMDER2	ADD	SISDERX	Spectra	0.3000
		SISDERY	Spectra	1.0000

COMDIS1	ADD	DEAD	Static	1.4000
COMDIS2	ADD	DEAD	Static	1.2000
		LIVE	Static	1.6000
COMDIS3	ADD	DEAD	Static	1.2000
		LIVE	Static	1.0000
		SISDISX	Spectra	1.0000
		SISDISY	Spectra	0.3000
COMDIS4	ADD	DEAD	Static	1.2000
		LIVE	Static	1.0000
		SISDISX	Spectra	0.3000
		SISDISY	Spectra	1.0000
COMDIS5	ADD	DEAD	Static	0.9000
		SISDISX	Spectra	1.0000
		SISDISY	Spectra	0.3000
COMDIS6	ADD	DEAD	Static	0.9000
		SISDISX	Spectra	0.3000
		SISDISY	Spectra	1.0000
ENVOLVENTE	ENVE	COMDIS1	Combo	1.0000
		COMDIS2	Combo	1.0000
		COMDIS3	Combo	1.0000
		COMDIS4	Combo	1.0000
		COMDIS5	Combo	1.0000
		COMDIS6	Combo	1.0000
COMDERUMBE	ADD	SISUMBX	Spectra	1.0000
		SISUMBY	Spectra	0.3000
COMDERUMBE2	ADD	SISUMBX	Spectra	0.3000
		SISUMBY	Spectra	1.0000
CIMEN1	ADD	DEAD	Static	1.0000
		LIVE	Static	1.0000
CIMEN2	ADD	DEAD	Static	1.0000
		LIVE	Static	0.7500
		SISDISX	Spectra	0.5250
		SISDISY	Spectra	0.1575
CIMEN3	ADD	DEAD	Static	1.0000
		LIVE	Static	0.7500
		SISDISX	Spectra	0.1575
		SISDISY	Spectra	0.5250

ETABS v9.7.4 File:MODELO RAMPA Units:KN-m Octubre 5, 2016 15:07 PAGE 13

R E S P O N S E S P E C T R U M F U N C T I O N - F R O M F I L E

FUNCTION NAME: DERIVAS

FILE NAME: c:\users\dyein_000\desktop\proyectos diana achury\29. dye16-2253 institución educativa barrio obrero, ipiales (nariño) [1.75mp]\entrega septiembre 2016\modelo rampa\derivadas.txt

DATA TYPE: Period vs Acceleration

NUMBER OF HEADER LINES = 0

PERIOD	ACCEL
0.0000	1.1250
0.0300	1.1250
0.0700	1.1250
0.1000	1.1250
0.1300	1.1250
0.2600	1.1250
0.3800	1.1250
0.5100	1.1250
0.6300	1.1250
0.8500	0.8370
1.0700	0.6660
1.2900	0.5530
1.5100	0.4730
1.7200	0.4130
1.9400	0.3670
2.1600	0.3300
2.3800	0.3000
2.6000	0.2740
2.8100	0.2530
3.0300	0.2350
3.2500	0.2190
3.4700	0.2050
3.6900	0.1930
3.9100	0.1820
4.1200	0.1730
4.3400	0.1640



4.5600	0.1560
5.5600	0.1050
6.5600	0.0750

FUNCTION NAME: DISEÑO

FILE NAME: c:\users\dyein_000\desktop\proyectos diana achury\29. dye16-2253 institución educativa barrio obrero, ipiales (nariño) [1.75mp]\entrega septiembre 2016\modelo rampa\diseño.txt
DATA TYPE: Period vs Acceleration
NUMBER OF HEADER LINES = 0

PERIOD	ACCEL
0.0000	0.7500
0.0300	0.7500
0.0700	0.7500
0.1000	0.7500
0.1300	0.7500
0.2600	0.7500
0.3800	0.7500
0.5100	0.7500
0.6300	0.7500
0.8500	0.5580
1.0700	0.4440
1.2900	0.3690
1.5100	0.3150
1.7200	0.2760
1.9400	0.2450
2.1600	0.2200
2.3800	0.2000
2.6000	0.1830
2.8100	0.1690
3.0300	0.1570
3.2500	0.1460
3.4700	0.1370
3.6900	0.1290
3.9100	0.1220
4.1200	0.1150
4.3400	0.1090
4.5600	0.1040
5.5600	0.0700
6.5600	0.0500

FUNCTION NAME: UMBRAL

FILE NAME: c:\users\dyein_000\desktop\proyectos diana achury\29. dye16-2253 institución educativa barrio obrero, ipiales (nariño) [1.75mp]\entrega septiembre 2016\modelo rampa\umbral.txt
DATA TYPE: Period vs Acceleration
NUMBER OF HEADER LINES = 0

PERIOD	ACCEL
0.0000	0.0800
0.0500	0.1120
0.1000	0.1440
0.1500	0.1760
0.2000	0.2080
0.2500	0.2400
0.4100	0.2400
0.5600	0.2400
0.7200	0.2400
0.8800	0.2400
1.0300	0.2400
1.1900	0.2400
1.3400	0.2400
1.5000	0.2400
2.1400	0.1680
2.7900	0.1290
3.4300	0.1050
4.0700	0.0880
4.7100	0.0760
5.3600	0.0670
6.0000	0.0600
6.6400	0.0540

7.2900	0.0490
7.9300	0.0450
8.5700	0.0420
9.2100	0.0390
9.8600	0.0370
10.5000	0.0240
11.5000	0.0200
12.5000	0.0170

ETABS v9.7.4 File:MODELO RAMPA Units:KN-m Octubre 5, 2016 15:07 PAGE 14

FRAME SECTION ASSIGNMENTS TO LINE OBJECTS

STORY LEVEL	LINE ID	LINE TYPE	SECTION TYPE	AUTO SELECT SECTION	ANALYSIS SECTION	DESIGN PROCEDURE	DESIGN SECTION
N+3.45	C7	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+3.45	C6-1	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+2.64	C6	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+2.64	C7	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+2.64	C5-1	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+1.83	C4	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+1.83	C5	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+1.83	C6	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+1.83	C7	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+1.83	C3-1	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+1.02	C3	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+1.02	C4	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+1.02	C5	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+1.02	C6	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+1.02	C7	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+1.02	C2-1	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+0.21	C1	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+0.21	C2	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+0.21	C3	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+0.21	C4	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+0.21	C5	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+0.21	C6	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+0.21	C7	Column	Rectangular	None	COL50X50	Conc Frame	COL50X50
N+3.45	B47	Beam	Rectangular	None	VIG40X45	Conc Frame	VIG40X45
N+3.45	B48	Beam	Rectangular	None	VIG40X45	Conc Frame	VIG40X45
N+3.45	B49	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+3.45	B50	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+3.45	B51	Beam	Rectangular	None	VIG40X45	Conc Frame	VIG40X45
N+3.45	B52	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+3.45	B53	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+3.45	B62	Beam	Rectangular	None	VIG40X45	Conc Frame	VIG40X45
N+3.45	B63	Beam	Rectangular	None	VIG40X45	Conc Frame	VIG40X45
N+2.64	B40	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+2.64	B41	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+2.64	B42	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+2.64	B43	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+2.64	B44	Beam	Rectangular	None	VIG40X45	Conc Frame	VIG40X45
N+2.64	B45	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+2.64	B46	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+2.64	B60	Beam	Rectangular	None	VIG40X45	Conc Frame	VIG40X45
N+2.64	B61	Beam	Rectangular	None	VIG40X45	Conc Frame	VIG40X45
N+1.83	B26	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+1.83	B27	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+1.83	B28	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+1.83	B29	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+1.83	B30	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+1.83	B31	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+1.83	B32	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+1.83	B33	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+1.83	B34	Beam	Rectangular	None	VIG40X45	Conc Frame	VIG40X45
N+1.83	B35	Beam	Rectangular	None	VIG40X45	Conc Frame	VIG40X45
N+1.83	B36	Beam	Rectangular	None	VIG40X45	Conc Frame	VIG40X45
N+1.83	B37	Beam	Rectangular	None	VIG40X45	Conc Frame	VIG40X45
N+1.83	B58	Beam	Rectangular	None	VIG40X45	Conc Frame	VIG40X45
N+1.83	B59	Beam	Rectangular	None	VIG40X45	Conc Frame	VIG40X45
N+1.02	B13	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+1.02	B14	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+1.02	B15	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+1.02	B16	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+1.02	B17	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+1.02	B18	Beam	Rectangular	None	VIG15X45	Conc Frame	VIG15X45
N+1.02	B20	Beam	Rectangular	None	VIG40X45	Conc Frame	VIG40X45

N+1.02	B56	Beam	Rectangular	None	VIG40X45	Conc	Frame	VIG40X45
N+1.02	B57	Beam	Rectangular	None	VIG40X45	Conc	Frame	VIG40X45
N+0.21	B2	Beam	Rectangular	None	VIG40X45	Conc	Frame	VIG40X45
N+0.21	B3	Beam	Rectangular	None	VIG40X45	Conc	Frame	VIG40X45
N+0.21	B4	Beam	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+0.21	B5	Beam	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+0.21	B6	Beam	Rectangular	None	VIG40X45	Conc	Frame	VIG40X45
N+0.21	B7	Beam	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+0.21	B8	Beam	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+3.45	D11	Brace	Rectangular	None	VIG40X45	Conc	Frame	VIG40X45
N+3.45	D12	Brace	Rectangular	None	VIG40X45	Conc	Frame	VIG40X45
N+3.45	D34	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+3.45	D35	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+3.45	D36	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+3.45	D37	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+2.64	D8	Brace	Rectangular	None	VIG40X45	Conc	Frame	VIG40X45
N+2.64	D9	Brace	Rectangular	None	VIG40X45	Conc	Frame	VIG40X45
N+2.64	D30	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+2.64	D31	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+2.64	D32	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+2.64	D33	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+1.83	D5	Brace	Rectangular	None	VIG40X45	Conc	Frame	VIG40X45
N+1.83	D6	Brace	Rectangular	None	VIG40X45	Conc	Frame	VIG40X45
N+1.83	D26	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+1.83	D27	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+1.83	D28	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+1.83	D29	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+1.02	D2	Brace	Rectangular	None	VIG40X45	Conc	Frame	VIG40X45
N+1.02	D3	Brace	Rectangular	None	VIG40X45	Conc	Frame	VIG40X45
N+1.02	D22	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+1.02	D23	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+1.02	D24	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+1.02	D25	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+0.21	D38	Brace	Rectangular	None	VIG40X45	Conc	Frame	VIG40X45
N+0.21	D39	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45
N+0.21	D40	Brace	Rectangular	None	VIG15X45	Conc	Frame	VIG15X45

ETABS v9.7.4 File:MODELO RAMPA Units:KN-m Octubre 5, 2016 15:07 PAGE 15

D I S T R I B U T E D L O A D A S S I G N M E N T S T O L I N E O B J E C T S

LOAD CASE	STORY LEVEL	LINE ID	LOAD TYPE	LOAD DIRECTION	ABSOLUTE DISTANCE A	ABSOLUTE DISTANCE B	LOAD A PER LENGTH	LOAD B PER LENGTH
DEAD	N+3.45	D11	Force	Gravity	0.000	1.887	3.060	3.060
DEAD	N+3.45	D12	Force	Gravity	0.000	7.478	3.060	3.060
DEAD	N+3.45	D34	Force	Gravity	0.000	1.887	1.530	1.530
DEAD	N+3.45	D35	Force	Gravity	0.000	7.478	1.530	1.530
DEAD	N+3.45	D36	Force	Gravity	0.000	1.887	1.530	1.530
DEAD	N+3.45	D37	Force	Gravity	0.000	7.478	1.530	1.530
DEAD	N+2.64	D8	Force	Gravity	0.000	6.530	3.060	3.060
DEAD	N+2.64	D9	Force	Gravity	0.000	2.655	3.060	3.060
DEAD	N+2.64	D30	Force	Gravity	0.000	6.530	1.530	1.530
DEAD	N+2.64	D31	Force	Gravity	0.000	2.655	1.530	1.530
DEAD	N+2.64	D32	Force	Gravity	0.000	6.530	1.530	1.530
DEAD	N+2.64	D33	Force	Gravity	0.000	2.655	1.530	1.530
DEAD	N+1.83	D5	Force	Gravity	0.000	1.787	3.060	3.060
DEAD	N+1.83	D6	Force	Gravity	0.000	7.399	3.060	3.060
DEAD	N+1.83	D26	Force	Gravity	0.000	1.787	1.530	1.530
DEAD	N+1.83	D27	Force	Gravity	0.000	7.399	1.530	1.530
DEAD	N+1.83	D28	Force	Gravity	0.000	1.787	1.530	1.530
DEAD	N+1.83	D29	Force	Gravity	0.000	7.399	1.530	1.530
DEAD	N+1.02	D2	Force	Gravity	0.000	5.281	3.060	3.060
DEAD	N+1.02	D3	Force	Gravity	0.000	3.915	3.060	3.060
DEAD	N+1.02	D22	Force	Gravity	0.000	5.281	1.530	1.530
DEAD	N+1.02	D23	Force	Gravity	0.000	3.915	1.530	1.530
DEAD	N+1.02	D24	Force	Gravity	0.000	5.281	1.530	1.530
DEAD	N+1.02	D25	Force	Gravity	0.000	3.915	1.530	1.530
DEAD	N+0.21	D38	Force	Gravity	0.000	3.151	3.060	3.060
DEAD	N+0.21	D39	Force	Gravity	0.000	3.151	1.530	1.530
DEAD	N+0.21	D40	Force	Gravity	0.000	3.151	1.530	1.530
LIVE	N+3.45	D11	Force	Gravity	0.000	1.887	4.500	4.500
LIVE	N+3.45	D12	Force	Gravity	0.000	7.478	4.500	4.500
LIVE	N+3.45	D34	Force	Gravity	0.000	1.887	2.250	2.250
LIVE	N+3.45	D35	Force	Gravity	0.000	7.478	2.250	2.250
LIVE	N+3.45	D36	Force	Gravity	0.000	1.887	2.250	2.250
LIVE	N+3.45	D37	Force	Gravity	0.000	7.478	2.250	2.250
LIVE	N+2.64	D8	Force	Gravity	0.000	6.530	4.500	4.500

LIVE	N+2.64	D9	Force	Gravity	0.000	2.655	4.500	4.500
LIVE	N+2.64	D30	Force	Gravity	0.000	6.530	2.250	2.250
LIVE	N+2.64	D31	Force	Gravity	0.000	2.655	2.250	2.250
LIVE	N+2.64	D32	Force	Gravity	0.000	6.530	2.250	2.250
LIVE	N+2.64	D33	Force	Gravity	0.000	2.655	2.250	2.250
LIVE	N+1.83	D5	Force	Gravity	0.000	1.787	4.500	4.500
LIVE	N+1.83	D6	Force	Gravity	0.000	7.399	4.500	4.500
LIVE	N+1.83	D26	Force	Gravity	0.000	1.787	2.250	2.250
LIVE	N+1.83	D27	Force	Gravity	0.000	7.399	2.250	2.250
LIVE	N+1.83	D28	Force	Gravity	0.000	1.787	2.250	2.250
LIVE	N+1.83	D29	Force	Gravity	0.000	7.399	2.250	2.250
LIVE	N+1.02	D2	Force	Gravity	0.000	5.281	4.500	4.500
LIVE	N+1.02	D3	Force	Gravity	0.000	3.915	4.500	4.500
LIVE	N+1.02	D22	Force	Gravity	0.000	5.281	2.250	2.250
LIVE	N+1.02	D23	Force	Gravity	0.000	3.915	2.250	2.250
LIVE	N+1.02	D24	Force	Gravity	0.000	5.281	2.250	2.250
LIVE	N+1.02	D25	Force	Gravity	0.000	3.915	2.250	2.250
LIVE	N+0.21	D38	Force	Gravity	0.000	3.151	4.500	4.500
LIVE	N+0.21	D39	Force	Gravity	0.000	3.151	2.250	2.250
LIVE	N+0.21	D40	Force	Gravity	0.000	3.151	2.250	2.250

ETABS v9.7.4 File:MODELO RAMPA Units:KN-m Octubre 5, 2016 15:07 PAGE 16

U N I F O R M L O A D A S S I G N M E N T S T O A R E A O B J E C T S

CASE	STORY	AREA	AREATYPE	DIRECTION	LOAD
LIVE	N+3.45	F11	Floor	Gravity	5.0000
LIVE	N+3.45	F12	Floor	Gravity	5.0000
LIVE	N+2.64	F9	Floor	Gravity	5.0000
LIVE	N+2.64	F10	Floor	Gravity	5.0000
LIVE	N+1.83	F5	Floor	Gravity	5.0000
LIVE	N+1.83	F6	Floor	Gravity	5.0000
LIVE	N+1.83	F7	Floor	Gravity	5.0000
LIVE	N+1.83	F8	Floor	Gravity	5.0000
LIVE	N+1.02	F3	Floor	Gravity	5.0000
LIVE	N+1.02	F4	Floor	Gravity	5.0000
LIVE	N+0.21	F1	Floor	Gravity	5.0000
LIVE	N+0.21	F2	Floor	Gravity	5.0000



FUERZAS EN VIGAS

BEAM FORCES

UNID: kN-m

Story	Beam	Load	Loc	P	V2	V3	T	M2	M3
N+0.21	B2	ENVOLVENTE MAJ	0.000	0.000	45.010	0.000	9.922	0	1.421
N+0.21	B2	ENVOLVENTE MAJ	0.082	0.000	45.470	0.000	9.922	0	-0.218
N+0.21	B2	ENVOLVENTE MAJ	0.164	0.000	46.020	0.000	9.922	0	-1.684
N+0.21	B2	ENVOLVENTE MAJ	0.246	0.000	46.650	0.000	9.922	0	-3.172
N+0.21	B2	ENVOLVENTE MAJ	0.328	0.000	47.360	0.000	9.922	0	-4.686
N+0.21	B2	ENVOLVENTE MAJ	0.410	0.000	48.150	0.000	9.922	0	-6.211
N+0.21	B2	ENVOLVENTE MAJ	0.492	0.000	48.940	0.000	9.922	0	-7.655
N+0.21	B2	ENVOLVENTE MAJ	0.574	0.000	49.650	0.000	9.922	0	-9.13
N+0.21	B2	ENVOLVENTE MAJ	0.656	0.000	50.280	0.000	9.922	0	-10.635
N+0.21	B2	ENVOLVENTE MAJ	0.738	0.000	50.830	0.000	9.922	0	-12.167
N+0.21	B2	ENVOLVENTE MAJ	0.820	0.000	51.290	0.000	9.922	0	-13.725
N+0.21	B2	ENVOLVENTE MIJ	0.000	0.000	15.290	0.000	-0.746	0	-0.863
N+0.21	B2	ENVOLVENTE MIJ	0.082	0.000	15.620	0.000	-0.746	0	-3.76
N+0.21	B2	ENVOLVENTE MIJ	0.164	0.000	15.970	0.000	-0.746	0	-7.017
N+0.21	B2	ENVOLVENTE MIJ	0.246	0.000	16.340	0.000	-0.746	0	-10.816
N+0.21	B2	ENVOLVENTE MIJ	0.328	0.000	16.740	0.000	-0.746	0	-14.67
N+0.21	B2	ENVOLVENTE MIJ	0.410	0.000	17.150	0.000	-0.746	0	-18.585
N+0.21	B2	ENVOLVENTE MIJ	0.492	0.000	17.560	0.000	-0.746	0	-22.566
N+0.21	B2	ENVOLVENTE MIJ	0.574	0.000	17.950	0.000	-0.746	0	-26.609
N+0.21	B2	ENVOLVENTE MIJ	0.656	0.000	18.320	0.000	-0.746	0	-30.707
N+0.21	B2	ENVOLVENTE MIJ	0.738	0.000	18.670	0.000	-0.746	0	-34.853
N+0.21	B2	ENVOLVENTE MIJ	0.820	0.000	19.000	0.000	-0.746	0	-39.04
N+0.21	B3	ENVOLVENTE MAJ	0.000	0.000	-19.090	0.000	0.721	0	-13.806
N+0.21	B3	ENVOLVENTE MAJ	0.083	0.000	-18.760	0.000	0.721	0	-12.213
N+0.21	B3	ENVOLVENTE MAJ	0.166	0.000	-18.410	0.000	0.721	0	-10.647
N+0.21	B3	ENVOLVENTE MAJ	0.249	0.000	-18.030	0.000	0.721	0	-8.998
N+0.21	B3	ENVOLVENTE MAJ	0.332	0.000	-17.630	0.000	0.721	0	-7.353
N+0.21	B3	ENVOLVENTE MAJ	0.415	0.000	-17.220	0.000	0.721	0	-5.739
N+0.21	B3	ENVOLVENTE MAJ	0.498	0.000	-16.800	0.000	0.721	0	-4.157
N+0.21	B3	ENVOLVENTE MAJ	0.581	0.000	-16.400	0.000	0.721	0	-2.606
N+0.21	B3	ENVOLVENTE MAJ	0.664	0.000	-16.030	0.000	0.721	0	-1.083
N+0.21	B3	ENVOLVENTE MAJ	0.747	0.000	-15.670	0.000	0.721	0	0.414
N+0.21	B3	ENVOLVENTE MAJ	0.830	0.000	-15.340	0.000	0.721	0	2.082
N+0.21	B3	ENVOLVENTE MIJ	0.000	0.000	-51.400	0.000	-9.885	0	-39.565
N+0.21	B3	ENVOLVENTE MIJ	0.083	0.000	-50.930	0.000	-9.885	0	-35.318
N+0.21	B3	ENVOLVENTE MIJ	0.166	0.000	-50.370	0.000	-9.885	0	-31.113
N+0.21	B3	ENVOLVENTE MIJ	0.249	0.000	-49.730	0.000	-9.885	0	-26.958
N+0.21	B3	ENVOLVENTE MIJ	0.332	0.000	-49.010	0.000	-9.885	0	-22.859
N+0.21	B3	ENVOLVENTE MIJ	0.415	0.000	-48.210	0.000	-9.885	0	-18.824
N+0.21	B3	ENVOLVENTE MIJ	0.498	0.000	-47.400	0.000	-9.885	0	-14.857
N+0.21	B3	ENVOLVENTE MIJ	0.581	0.000	-46.680	0.000	-9.885	0	-10.953
N+0.21	B3	ENVOLVENTE MIJ	0.664	0.000	-46.040	0.000	-9.885	0	-7.605
N+0.21	B3	ENVOLVENTE MIJ	0.747	0.000	-45.490	0.000	-9.885	0	-4.441
N+0.21	B3	ENVOLVENTE MIJ	0.830	0.000	-45.020	0.000	-9.885	0	-1.519
N+0.21	B4	ENVOLVENTE MAJ	0.000	0.000	3.090	0.000	0.162	0	-0.08
N+0.21	B4	ENVOLVENTE MAJ	0.082	0.000	3.280	0.000	0.162	0	-0.174
N+0.21	B4	ENVOLVENTE MAJ	0.164	0.000	3.530	0.000	0.162	0	-0.105
N+0.21	B4	ENVOLVENTE MAJ	0.246	0.000	3.840	0.000	0.162	0	-0.009
N+0.21	B4	ENVOLVENTE MAJ	0.328	0.000	4.220	0.000	0.162	0	0.079
N+0.21	B4	ENVOLVENTE MAJ	0.410	0.000	4.650	0.000	0.162	0	0.153
N+0.21	B4	ENVOLVENTE MAJ	0.492	0.000	5.080	0.000	0.162	0	0.21
N+0.21	B4	ENVOLVENTE MAJ	0.574	0.000	5.460	0.000	0.162	0	0.251
N+0.21	B4	ENVOLVENTE MAJ	0.656	0.000	5.770	0.000	0.162	0	0.277
N+0.21	B4	ENVOLVENTE MAJ	0.738	0.000	6.020	0.000	0.162	0	0.29
N+0.21	B4	ENVOLVENTE MAJ	0.820	0.000	6.210	0.000	0.162	0	0.292
N+0.21	B4	ENVOLVENTE MIJ	0.000	0.000	-1.670	0.000	-0.107	0	-0.64
N+0.21	B4	ENVOLVENTE MIJ	0.082	0.000	-1.540	0.000	-0.107	0	-0.709
N+0.21	B4	ENVOLVENTE MIJ	0.164	0.000	-1.390	0.000	-0.107	0	-0.901
N+0.21	B4	ENVOLVENTE MIJ	0.246	0.000	-1.220	0.000	-0.107	0	-1.192
N+0.21	B4	ENVOLVENTE MIJ	0.328	0.000	-1.030	0.000	-0.107	0	-1.518
N+0.21	B4	ENVOLVENTE MIJ	0.410	0.000	-0.820	0.000	-0.107	0	-1.88
N+0.21	B4	ENVOLVENTE MIJ	0.492	0.000	-0.600	0.000	-0.107	0	-2.278
N+0.21	B4	ENVOLVENTE MIJ	0.574	0.000	-0.410	0.000	-0.107	0	-2.71
N+0.21	B4	ENVOLVENTE MIJ	0.656	0.000	-0.240	0.000	-0.107	0	-3.17
N+0.21	B4	ENVOLVENTE MIJ	0.738	0.000	-0.090	0.000	-0.107	0	-3.654
N+0.21	B4	ENVOLVENTE MIJ	0.820	0.000	0.040	0.000	-0.107	0	-4.156
N+0.21	B5	ENVOLVENTE MAJ	0.000	0.000	-0.220	0.000	0.110	0	0.172
N+0.21	B5	ENVOLVENTE MAJ	0.083	0.000	-0.090	0.000	0.110	0	0.185
N+0.21	B5	ENVOLVENTE MAJ	0.166	0.000	0.060	0.000	0.110	0	0.187



PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, IPIALES (NARIÑO)
DATOS DE SALIDA DEL MODELO

N+0.21	B5	ENVOLVENTE MAI	0.249	0.000	0.240	0.000	0.110	0	0.176
N+0.21	B5	ENVOLVENTE MAI	0.332	0.000	0.430	0.000	0.110	0	0.149
N+0.21	B5	ENVOLVENTE MAI	0.415	0.000	0.650	0.000	0.110	0	0.106
N+0.21	B5	ENVOLVENTE MAI	0.498	0.000	0.860	0.000	0.110	0	0.046
N+0.21	B5	ENVOLVENTE MAI	0.581	0.000	1.060	0.000	0.110	0	-0.029
N+0.21	B5	ENVOLVENTE MAI	0.664	0.000	1.230	0.000	0.110	0	-0.11
N+0.21	B5	ENVOLVENTE MAI	0.747	0.000	1.390	0.000	0.110	0	-0.164
N+0.21	B5	ENVOLVENTE MAI	0.830	0.000	1.520	0.000	0.110	0	-0.08
N+0.21	B5	ENVOLVENTE MII	0.000	0.000	-6.070	0.000	-0.168	0	-4.079
N+0.21	B5	ENVOLVENTE MII	0.083	0.000	-5.870	0.000	-0.168	0	-3.583
N+0.21	B5	ENVOLVENTE MII	0.166	0.000	-5.620	0.000	-0.168	0	-3.107
N+0.21	B5	ENVOLVENTE MII	0.249	0.000	-5.300	0.000	-0.168	0	-2.654
N+0.21	B5	ENVOLVENTE MII	0.332	0.000	-4.920	0.000	-0.168	0	-2.23
N+0.21	B5	ENVOLVENTE MII	0.415	0.000	-4.480	0.000	-0.168	0	-1.842
N+0.21	B5	ENVOLVENTE MII	0.498	0.000	-4.030	0.000	-0.168	0	-1.492
N+0.21	B5	ENVOLVENTE MII	0.581	0.000	-3.650	0.000	-0.168	0	-1.178
N+0.21	B5	ENVOLVENTE MII	0.664	0.000	-3.330	0.000	-0.168	0	-0.903
N+0.21	B5	ENVOLVENTE MII	0.747	0.000	-3.080	0.000	-0.168	0	-0.715
N+0.21	B5	ENVOLVENTE MII	0.830	0.000	-2.890	0.000	-0.168	0	-0.65
N+0.21	B6	ENVOLVENTE MAI	0.000	0.000	-15.850	0.000	1.311	0	-18.131
N+0.21	B6	ENVOLVENTE MAI	0.147	0.000	-15.210	0.000	1.311	0	-15.838
N+0.21	B6	ENVOLVENTE MAI	0.294	0.000	-14.440	0.000	1.311	0	-13.646
N+0.21	B6	ENVOLVENTE MAI	0.441	0.000	-13.540	0.000	1.311	0	-11.573
N+0.21	B6	ENVOLVENTE MAI	0.588	0.000	-12.600	0.000	1.311	0	-9.631
N+0.21	B6	ENVOLVENTE MAI	0.735	0.000	-11.660	0.000	1.311	0	-7.815
N+0.21	B6	ENVOLVENTE MAI	0.882	0.000	-10.710	0.000	1.311	0	-6.111
N+0.21	B6	ENVOLVENTE MAI	1.029	0.000	-9.770	0.000	1.311	0	-4.467
N+0.21	B6	ENVOLVENTE MAI	1.176	0.000	-8.870	0.000	1.311	0	-2.627
N+0.21	B6	ENVOLVENTE MAI	1.323	0.000	-8.100	0.000	1.311	0	0.21
N+0.21	B6	ENVOLVENTE MAI	1.470	0.000	-7.460	0.000	1.311	0	4.619
N+0.21	B6	ENVOLVENTE MII	0.000	0.000	-57.820	0.000	-1.363	0	-69.153
N+0.21	B6	ENVOLVENTE MII	0.147	0.000	-56.800	0.000	-1.363	0	-60.723
N+0.21	B6	ENVOLVENTE MII	0.294	0.000	-55.250	0.000	-1.363	0	-52.48
N+0.21	B6	ENVOLVENTE MII	0.441	0.000	-53.190	0.000	-1.363	0	-44.504
N+0.21	B6	ENVOLVENTE MII	0.588	0.000	-51.050	0.000	-1.363	0	-36.848
N+0.21	B6	ENVOLVENTE MII	0.735	0.000	-49.190	0.000	-1.363	0	-29.52
N+0.21	B6	ENVOLVENTE MII	0.882	0.000	-47.320	0.000	-1.363	0	-22.519
N+0.21	B6	ENVOLVENTE MII	1.029	0.000	-45.460	0.000	-1.363	0	-15.846
N+0.21	B6	ENVOLVENTE MII	1.176	0.000	-43.720	0.000	-1.363	0	-9.494
N+0.21	B6	ENVOLVENTE MII	1.323	0.000	-42.370	0.000	-1.363	0	-4.19
N+0.21	B6	ENVOLVENTE MII	1.470	0.000	-41.410	0.000	-1.363	0	-1.303
N+0.21	B7	ENVOLVENTE MAI	0.000	0.000	-6.360	0.000	-0.065	0	-8.324
N+0.21	B7	ENVOLVENTE MAI	0.147	0.000	-6.120	0.000	-0.065	0	-7.394
N+0.21	B7	ENVOLVENTE MAI	0.294	0.000	-5.800	0.000	-0.065	0	-6.502
N+0.21	B7	ENVOLVENTE MAI	0.441	0.000	-5.420	0.000	-0.065	0	-5.653
N+0.21	B7	ENVOLVENTE MAI	0.588	0.000	-5.020	0.000	-0.065	0	-4.852
N+0.21	B7	ENVOLVENTE MAI	0.735	0.000	-4.620	0.000	-0.065	0	-4.09
N+0.21	B7	ENVOLVENTE MAI	0.882	0.000	-4.230	0.000	-0.065	0	-3.336
N+0.21	B7	ENVOLVENTE MAI	1.029	0.000	-3.830	0.000	-0.065	0	-2.538
N+0.21	B7	ENVOLVENTE MAI	1.176	0.000	-3.450	0.000	-0.065	0	-1.635
N+0.21	B7	ENVOLVENTE MAI	1.323	0.000	-3.130	0.000	-0.065	0	-0.611
N+0.21	B7	ENVOLVENTE MAI	1.470	0.000	-2.890	0.000	-0.065	0	0.477
N+0.21	B7	ENVOLVENTE MII	0.000	0.000	-21.760	0.000	-0.494	0	-28.46
N+0.21	B7	ENVOLVENTE MII	0.147	0.000	-21.340	0.000	-0.494	0	-25.289
N+0.21	B7	ENVOLVENTE MII	0.294	0.000	-20.660	0.000	-0.494	0	-22.198
N+0.21	B7	ENVOLVENTE MII	0.441	0.000	-19.730	0.000	-0.494	0	-19.227
N+0.21	B7	ENVOLVENTE MII	0.588	0.000	-18.720	0.000	-0.494	0	-16.401
N+0.21	B7	ENVOLVENTE MII	0.735	0.000	-17.700	0.000	-0.494	0	-13.724
N+0.21	B7	ENVOLVENTE MII	0.882	0.000	-16.690	0.000	-0.494	0	-11.197
N+0.21	B7	ENVOLVENTE MII	1.029	0.000	-15.670	0.000	-0.494	0	-8.819
N+0.21	B7	ENVOLVENTE MII	1.176	0.000	-14.790	0.000	-0.494	0	-6.586
N+0.21	B7	ENVOLVENTE MII	1.323	0.000	-14.210	0.000	-0.494	0	-4.473
N+0.21	B7	ENVOLVENTE MII	1.470	0.000	-13.830	0.000	-0.494	0	-3.028
N+0.21	B8	ENVOLVENTE MAI	0.000	0.000	-6.410	0.000	0.508	0	-8.325
N+0.21	B8	ENVOLVENTE MAI	0.147	0.000	-6.160	0.000	0.508	0	-7.388
N+0.21	B8	ENVOLVENTE MAI	0.294	0.000	-5.850	0.000	0.508	0	-6.489
N+0.21	B8	ENVOLVENTE MAI	0.441	0.000	-5.470	0.000	0.508	0	-5.635
N+0.21	B8	ENVOLVENTE MAI	0.588	0.000	-5.060	0.000	0.508	0	-4.828
N+0.21	B8	ENVOLVENTE MAI	0.735	0.000	-4.660	0.000	0.508	0	-4.06
N+0.21	B8	ENVOLVENTE MAI	0.882	0.000	-4.260	0.000	0.508	0	-3.3
N+0.21	B8	ENVOLVENTE MAI	1.029	0.000	-3.860	0.000	0.508	0	-2.515
N+0.21	B8	ENVOLVENTE MAI	1.176	0.000	-3.480	0.000	0.508	0	-1.642
N+0.21	B8	ENVOLVENTE MAI	1.323	0.000	-3.170	0.000	0.508	0	-0.651
N+0.21	B8	ENVOLVENTE MAI	1.470	0.000	-2.920	0.000	0.508	0	0.413
N+0.21	B8	ENVOLVENTE MII	0.000	0.000	-21.760	0.000	0.056	0	-28.476
N+0.21	B8	ENVOLVENTE MII	0.147	0.000	-21.350	0.000	0.056	0	-25.304



N+0.21	B8	ENVOLVENTE MII	0.294	0.000	-20.670	0.000	0.056	0	-22.212
N+0.21	B8	ENVOLVENTE MII	0.441	0.000	-19.730	0.000	0.056	0	-19.24
N+0.21	B8	ENVOLVENTE MII	0.588	0.000	-18.710	0.000	0.056	0	-16.414
N+0.21	B8	ENVOLVENTE MII	0.735	0.000	-17.690	0.000	0.056	0	-13.739
N+0.21	B8	ENVOLVENTE MII	0.882	0.000	-16.660	0.000	0.056	0	-11.214
N+0.21	B8	ENVOLVENTE MII	1.029	0.000	-15.640	0.000	0.056	0	-8.84
N+0.21	B8	ENVOLVENTE MII	1.176	0.000	-14.710	0.000	0.056	0	-6.612
N+0.21	B8	ENVOLVENTE MII	1.323	0.000	-14.130	0.000	0.056	0	-4.503
N+0.21	B8	ENVOLVENTE MII	1.470	0.000	-13.750	0.000	0.056	0	-3.01
N+1.02	B13	ENVOLVENTE MAI	0.000	0.000	2.140	0.000	0.355	0	0.1
N+1.02	B13	ENVOLVENTE MAI	0.082	0.000	2.330	0.000	0.355	0	-0.057
N+1.02	B13	ENVOLVENTE MAI	0.164	0.000	2.580	0.000	0.355	0	-0.121
N+1.02	B13	ENVOLVENTE MAI	0.246	0.000	2.890	0.000	0.355	0	0.022
N+1.02	B13	ENVOLVENTE MAI	0.328	0.000	3.260	0.000	0.355	0	0.162
N+1.02	B13	ENVOLVENTE MAI	0.410	0.000	3.700	0.000	0.355	0	0.288
N+1.02	B13	ENVOLVENTE MAI	0.492	0.000	4.130	0.000	0.355	0	0.396
N+1.02	B13	ENVOLVENTE MAI	0.574	0.000	4.510	0.000	0.355	0	0.488
N+1.02	B13	ENVOLVENTE MAI	0.656	0.000	4.820	0.000	0.355	0	0.565
N+1.02	B13	ENVOLVENTE MAI	0.738	0.000	5.070	0.000	0.355	0	0.629
N+1.02	B13	ENVOLVENTE MAI	0.820	0.000	5.260	0.000	0.355	0	0.682
N+1.02	B13	ENVOLVENTE MII	0.000	0.000	-2.290	0.000	-0.638	0	-0.769
N+1.02	B13	ENVOLVENTE MII	0.082	0.000	-2.160	0.000	-0.638	0	-0.613
N+1.02	B13	ENVOLVENTE MII	0.164	0.000	-2.010	0.000	-0.638	0	-0.582
N+1.02	B13	ENVOLVENTE MII	0.246	0.000	-1.840	0.000	-0.638	0	-0.787
N+1.02	B13	ENVOLVENTE MII	0.328	0.000	-1.650	0.000	-0.638	0	-1.036
N+1.02	B13	ENVOLVENTE MII	0.410	0.000	-1.440	0.000	-0.638	0	-1.32
N+1.02	B13	ENVOLVENTE MII	0.492	0.000	-1.220	0.000	-0.638	0	-1.64
N+1.02	B13	ENVOLVENTE MII	0.574	0.000	-1.030	0.000	-0.638	0	-1.995
N+1.02	B13	ENVOLVENTE MII	0.656	0.000	-0.860	0.000	-0.638	0	-2.377
N+1.02	B13	ENVOLVENTE MII	0.738	0.000	-0.710	0.000	-0.638	0	-2.783
N+1.02	B13	ENVOLVENTE MII	0.820	0.000	-0.580	0.000	-0.638	0	-3.206
N+1.02	B14	ENVOLVENTE MAI	0.000	0.000	0.890	0.000	0.603	0	0.912
N+1.02	B14	ENVOLVENTE MAI	0.083	0.000	1.020	0.000	0.603	0	0.833
N+1.02	B14	ENVOLVENTE MAI	0.166	0.000	1.180	0.000	0.603	0	0.742
N+1.02	B14	ENVOLVENTE MAI	0.249	0.000	1.350	0.000	0.603	0	0.638
N+1.02	B14	ENVOLVENTE MAI	0.332	0.000	1.540	0.000	0.603	0	0.519
N+1.02	B14	ENVOLVENTE MAI	0.415	0.000	1.760	0.000	0.603	0	0.383
N+1.02	B14	ENVOLVENTE MAI	0.498	0.000	1.980	0.000	0.603	0	0.229
N+1.02	B14	ENVOLVENTE MAI	0.581	0.000	2.170	0.000	0.603	0	0.062
N+1.02	B14	ENVOLVENTE MAI	0.664	0.000	2.350	0.000	0.603	0	-0.103
N+1.02	B14	ENVOLVENTE MAI	0.747	0.000	2.500	0.000	0.603	0	-0.045
N+1.02	B14	ENVOLVENTE MAI	0.830	0.000	2.630	0.000	0.603	0	0.164
N+1.02	B14	ENVOLVENTE MII	0.000	0.000	-5.870	0.000	-0.395	0	-3.622
N+1.02	B14	ENVOLVENTE MII	0.083	0.000	-5.680	0.000	-0.395	0	-3.142
N+1.02	B14	ENVOLVENTE MII	0.166	0.000	-5.420	0.000	-0.395	0	-2.682
N+1.02	B14	ENVOLVENTE MII	0.249	0.000	-5.110	0.000	-0.395	0	-2.245
N+1.02	B14	ENVOLVENTE MII	0.332	0.000	-4.730	0.000	-0.395	0	-1.837
N+1.02	B14	ENVOLVENTE MII	0.415	0.000	-4.280	0.000	-0.395	0	-1.464
N+1.02	B14	ENVOLVENTE MII	0.498	0.000	-3.840	0.000	-0.395	0	-1.129
N+1.02	B14	ENVOLVENTE MII	0.581	0.000	-3.460	0.000	-0.395	0	-0.831
N+1.02	B14	ENVOLVENTE MII	0.664	0.000	-3.140	0.000	-0.395	0	-0.581
N+1.02	B14	ENVOLVENTE MII	0.747	0.000	-2.890	0.000	-0.395	0	-0.59
N+1.02	B14	ENVOLVENTE MII	0.830	0.000	-2.690	0.000	-0.395	0	-0.781
N+1.02	B15	ENVOLVENTE MAI	0.000	0.000	2.400	0.000	0.576	0	0.141
N+1.02	B15	ENVOLVENTE MAI	0.082	0.000	2.590	0.000	0.576	0	0.039
N+1.02	B15	ENVOLVENTE MAI	0.164	0.000	2.840	0.000	0.576	0	0.011
N+1.02	B15	ENVOLVENTE MAI	0.246	0.000	3.150	0.000	0.576	0	0.056
N+1.02	B15	ENVOLVENTE MAI	0.328	0.000	3.530	0.000	0.576	0	0.114
N+1.02	B15	ENVOLVENTE MAI	0.410	0.000	3.960	0.000	0.576	0	0.163
N+1.02	B15	ENVOLVENTE MAI	0.492	0.000	4.390	0.000	0.576	0	0.199
N+1.02	B15	ENVOLVENTE MAI	0.574	0.000	4.770	0.000	0.576	0	0.219
N+1.02	B15	ENVOLVENTE MAI	0.656	0.000	5.080	0.000	0.576	0	0.224
N+1.02	B15	ENVOLVENTE MAI	0.738	0.000	5.330	0.000	0.576	0	0.217
N+1.02	B15	ENVOLVENTE MAI	0.820	0.000	5.520	0.000	0.576	0	0.199
N+1.02	B15	ENVOLVENTE MII	0.000	0.000	-1.430	0.000	-0.327	0	-0.392
N+1.02	B15	ENVOLVENTE MII	0.082	0.000	-1.300	0.000	-0.327	0	-0.382
N+1.02	B15	ENVOLVENTE MII	0.164	0.000	-1.150	0.000	-0.327	0	-0.476
N+1.02	B15	ENVOLVENTE MII	0.246	0.000	-0.980	0.000	-0.327	0	-0.679
N+1.02	B15	ENVOLVENTE MII	0.328	0.000	-0.790	0.000	-0.327	0	-0.936
N+1.02	B15	ENVOLVENTE MII	0.410	0.000	-0.580	0.000	-0.327	0	-1.236
N+1.02	B15	ENVOLVENTE MII	0.492	0.000	-0.370	0.000	-0.327	0	-1.576
N+1.02	B15	ENVOLVENTE MII	0.574	0.000	-0.180	0.000	-0.327	0	-1.95
N+1.02	B15	ENVOLVENTE MII	0.656	0.000	0.000	0.000	-0.327	0	-2.353
N+1.02	B15	ENVOLVENTE MII	0.738	0.000	0.150	0.000	-0.327	0	-2.779
N+1.02	B15	ENVOLVENTE MII	0.820	0.000	0.280	0.000	-0.327	0	-3.223
N+1.02	B16	ENVOLVENTE MAI	0.000	0.000	-0.280	0.000	0.316	0	0.181



PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, IPIALES (NARIÑO)
DATOS DE SALIDA DEL MODELO

N+1.02	B16	ENVOLVENTE MAI	0.083	0.000	-0.150	0.000	0.316	0	0.2
N+1.02	B16	ENVOLVENTE MAI	0.166	0.000	0.000	0.000	0.316	0	0.207
N+1.02	B16	ENVOLVENTE MAI	0.249	0.000	0.170	0.000	0.316	0	0.201
N+1.02	B16	ENVOLVENTE MAI	0.332	0.000	0.370	0.000	0.316	0	0.18
N+1.02	B16	ENVOLVENTE MAI	0.415	0.000	0.580	0.000	0.316	0	0.145
N+1.02	B16	ENVOLVENTE MAI	0.498	0.000	0.800	0.000	0.316	0	0.094
N+1.02	B16	ENVOLVENTE MAI	0.581	0.000	1.000	0.000	0.316	0	0.032
N+1.02	B16	ENVOLVENTE MAI	0.664	0.000	1.170	0.000	0.316	0	-0.017
N+1.02	B16	ENVOLVENTE MAI	0.747	0.000	1.320	0.000	0.316	0	0.036
N+1.02	B16	ENVOLVENTE MAI	0.830	0.000	1.450	0.000	0.316	0	0.168
N+1.02	B16	ENVOLVENTE MII	0.000	0.000	-5.760	0.000	-0.625	0	-3.383
N+1.02	B16	ENVOLVENTE MII	0.083	0.000	-5.570	0.000	-0.625	0	-2.913
N+1.02	B16	ENVOLVENTE MII	0.166	0.000	-5.320	0.000	-0.625	0	-2.461
N+1.02	B16	ENVOLVENTE MII	0.249	0.000	-5.000	0.000	-0.625	0	-2.034
N+1.02	B16	ENVOLVENTE MII	0.332	0.000	-4.620	0.000	-0.625	0	-1.635
N+1.02	B16	ENVOLVENTE MII	0.415	0.000	-4.170	0.000	-0.625	0	-1.275
N+1.02	B16	ENVOLVENTE MII	0.498	0.000	-3.730	0.000	-0.625	0	-0.954
N+1.02	B16	ENVOLVENTE MII	0.581	0.000	-3.350	0.000	-0.625	0	-0.672
N+1.02	B16	ENVOLVENTE MII	0.664	0.000	-3.030	0.000	-0.625	0	-0.449
N+1.02	B16	ENVOLVENTE MII	0.747	0.000	-2.780	0.000	-0.625	0	-0.365
N+1.02	B16	ENVOLVENTE MII	0.830	0.000	-2.580	0.000	-0.625	0	-0.39
N+1.02	B17	ENVOLVENTE MAI	0.000	0.000	5.560	0.000	0.511	0	13.891
N+1.02	B17	ENVOLVENTE MAI	0.165	0.000	6.010	0.000	0.511	0	12.958
N+1.02	B17	ENVOLVENTE MAI	0.330	0.000	6.700	0.000	0.511	0	11.942
N+1.02	B17	ENVOLVENTE MAI	0.495	0.000	7.610	0.000	0.511	0	11.237
N+1.02	B17	ENVOLVENTE MAI	0.660	0.000	8.550	0.000	0.511	0	10.389
N+1.02	B17	ENVOLVENTE MAI	0.825	0.000	9.500	0.000	0.511	0	9.351
N+1.02	B17	ENVOLVENTE MAI	0.990	0.000	10.440	0.000	0.511	0	8.124
N+1.02	B17	ENVOLVENTE MAI	1.155	0.000	11.380	0.000	0.511	0	7.151
N+1.02	B17	ENVOLVENTE MAI	1.320	0.000	12.290	0.000	0.511	0	6.379
N+1.02	B17	ENVOLVENTE MAI	1.485	0.000	12.980	0.000	0.511	0	5.504
N+1.02	B17	ENVOLVENTE MAI	1.650	0.000	13.430	0.000	0.511	0	4.548
N+1.02	B17	ENVOLVENTE MII	0.000	0.000	-2.900	0.000	-0.472	0	2.392
N+1.02	B17	ENVOLVENTE MII	0.165	0.000	-2.610	0.000	-0.472	0	2.83
N+1.02	B17	ENVOLVENTE MII	0.330	0.000	-2.250	0.000	-0.472	0	3.203
N+1.02	B17	ENVOLVENTE MII	0.495	0.000	-1.810	0.000	-0.472	0	3.481
N+1.02	B17	ENVOLVENTE MII	0.660	0.000	-1.360	0.000	-0.472	0	3.575
N+1.02	B17	ENVOLVENTE MII	0.825	0.000	-0.910	0.000	-0.472	0	3.316
N+1.02	B17	ENVOLVENTE MII	0.990	0.000	-0.460	0.000	-0.472	0	2.539
N+1.02	B17	ENVOLVENTE MII	1.155	0.000	-0.010	0.000	-0.472	0	1.482
N+1.02	B17	ENVOLVENTE MII	1.320	0.000	0.430	0.000	-0.472	0	0.262
N+1.02	B17	ENVOLVENTE MII	1.485	0.000	0.800	0.000	-0.472	0	-1.054
N+1.02	B17	ENVOLVENTE MII	1.650	0.000	1.080	0.000	-0.472	0	-2.437
N+1.02	B18	ENVOLVENTE MAI	0.000	0.000	6.230	0.000	0.484	0	14.213
N+1.02	B18	ENVOLVENTE MAI	0.165	0.000	6.670	0.000	0.484	0	13.168
N+1.02	B18	ENVOLVENTE MAI	0.330	0.000	7.360	0.000	0.484	0	12.04
N+1.02	B18	ENVOLVENTE MAI	0.495	0.000	8.270	0.000	0.484	0	11.18
N+1.02	B18	ENVOLVENTE MAI	0.660	0.000	9.210	0.000	0.484	0	10.341
N+1.02	B18	ENVOLVENTE MAI	0.825	0.000	10.140	0.000	0.484	0	9.314
N+1.02	B18	ENVOLVENTE MAI	0.990	0.000	11.080	0.000	0.484	0	8.098
N+1.02	B18	ENVOLVENTE MAI	1.155	0.000	12.010	0.000	0.484	0	7.531
N+1.02	B18	ENVOLVENTE MAI	1.320	0.000	12.920	0.000	0.484	0	6.896
N+1.02	B18	ENVOLVENTE MAI	1.485	0.000	13.610	0.000	0.484	0	6.154
N+1.02	B18	ENVOLVENTE MAI	1.650	0.000	14.060	0.000	0.484	0	5.329
N+1.02	B18	ENVOLVENTE MII	0.000	0.000	-3.620	0.000	-0.451	0	1.979
N+1.02	B18	ENVOLVENTE MII	0.165	0.000	-3.330	0.000	-0.451	0	2.537
N+1.02	B18	ENVOLVENTE MII	0.330	0.000	-2.970	0.000	-0.451	0	3.032
N+1.02	B18	ENVOLVENTE MII	0.495	0.000	-2.530	0.000	-0.451	0	3.431
N+1.02	B18	ENVOLVENTE MII	0.660	0.000	-2.080	0.000	-0.451	0	3.613
N+1.02	B18	ENVOLVENTE MII	0.825	0.000	-1.630	0.000	-0.451	0	3.258
N+1.02	B18	ENVOLVENTE MII	0.990	0.000	-1.190	0.000	-0.451	0	2.283
N+1.02	B18	ENVOLVENTE MII	1.155	0.000	-0.740	0.000	-0.451	0	1.092
N+1.02	B18	ENVOLVENTE MII	1.320	0.000	-0.300	0.000	-0.451	0	-0.247
N+1.02	B18	ENVOLVENTE MII	1.485	0.000	0.070	0.000	-0.451	0	-1.679
N+1.02	B18	ENVOLVENTE MII	1.650	0.000	0.350	0.000	-0.451	0	-3.175
N+1.02	B20	ENVOLVENTE MAI	0.000	0.000	15.170	0.000	5.355	0	39.419
N+1.02	B20	ENVOLVENTE MAI	0.165	0.000	16.280	0.000	5.355	0	37.504
N+1.02	B20	ENVOLVENTE MAI	0.330	0.000	17.880	0.000	5.355	0	35.804
N+1.02	B20	ENVOLVENTE MAI	0.495	0.000	19.910	0.000	5.355	0	33.748
N+1.02	B20	ENVOLVENTE MAI	0.660	0.000	22.000	0.000	5.355	0	31.281
N+1.02	B20	ENVOLVENTE MAI	0.825	0.000	24.090	0.000	5.355	0	28.402
N+1.02	B20	ENVOLVENTE MAI	0.990	0.000	26.180	0.000	5.355	0	25.11
N+1.02	B20	ENVOLVENTE MAI	1.155	0.000	28.280	0.000	5.355	0	21.437
N+1.02	B20	ENVOLVENTE MAI	1.320	0.000	30.310	0.000	5.355	0	19.388
N+1.02	B20	ENVOLVENTE MAI	1.485	0.000	31.910	0.000	5.355	0	17.061
N+1.02	B20	ENVOLVENTE MAI	1.650	0.000	33.010	0.000	5.355	0	14.522



N+1.02	B20	ENVOLVENTE MII	0.000	0.000	-5.790	0.000	-4.951	0	9.57
N+1.02	B20	ENVOLVENTE MII	0.165	0.000	-5.070	0.000	-4.951	0	10.446
N+1.02	B20	ENVOLVENTE MII	0.330	0.000	-4.180	0.000	-4.951	0	11.174
N+1.02	B20	ENVOLVENTE MII	0.495	0.000	-3.140	0.000	-4.951	0	11.703
N+1.02	B20	ENVOLVENTE MII	0.660	0.000	-2.080	0.000	-4.951	0	11.914
N+1.02	B20	ENVOLVENTE MII	0.825	0.000	-1.020	0.000	-4.951	0	11.164
N+1.02	B20	ENVOLVENTE MII	0.990	0.000	0.040	0.000	-4.951	0	8.89
N+1.02	B20	ENVOLVENTE MII	1.155	0.000	1.100	0.000	-4.951	0	6.08
N+1.02	B20	ENVOLVENTE MII	1.320	0.000	2.140	0.000	-4.951	0	3.024
N+1.02	B20	ENVOLVENTE MII	1.485	0.000	3.030	0.000	-4.951	0	-0.217
N+1.02	B20	ENVOLVENTE MII	1.650	0.000	3.750	0.000	-4.951	0	-3.602
N+1.83	B26	ENVOLVENTE MAI	0.000	0.000	26.960	0.000	0.895	0	15.286
N+1.83	B26	ENVOLVENTE MAI	0.082	0.000	27.150	0.000	0.895	0	14.393
N+1.83	B26	ENVOLVENTE MAI	0.164	0.000	27.400	0.000	0.895	0	13.513
N+1.83	B26	ENVOLVENTE MAI	0.246	0.000	27.710	0.000	0.895	0	12.64
N+1.83	B26	ENVOLVENTE MAI	0.328	0.000	28.080	0.000	0.895	0	11.778
N+1.83	B26	ENVOLVENTE MAI	0.410	0.000	28.520	0.000	0.895	0	10.948
N+1.83	B26	ENVOLVENTE MAI	0.492	0.000	28.950	0.000	0.895	0	10.111
N+1.83	B26	ENVOLVENTE MAI	0.574	0.000	29.330	0.000	0.895	0	9.266
N+1.83	B26	ENVOLVENTE MAI	0.656	0.000	29.640	0.000	0.895	0	8.413
N+1.83	B26	ENVOLVENTE MAI	0.738	0.000	29.890	0.000	0.895	0	7.552
N+1.83	B26	ENVOLVENTE MAI	0.820	0.000	30.080	0.000	0.895	0	6.684
N+1.83	B26	ENVOLVENTE MII	0.000	0.000	0.840	0.000	-0.751	0	-20.725
N+1.83	B26	ENVOLVENTE MII	0.082	0.000	0.970	0.000	-0.751	0	-22.124
N+1.83	B26	ENVOLVENTE MII	0.164	0.000	1.120	0.000	-0.751	0	-23.566
N+1.83	B26	ENVOLVENTE MII	0.246	0.000	1.300	0.000	-0.751	0	-25.051
N+1.83	B26	ENVOLVENTE MII	0.328	0.000	1.490	0.000	-0.751	0	-26.59
N+1.83	B26	ENVOLVENTE MII	0.410	0.000	1.700	0.000	-0.751	0	-28.211
N+1.83	B26	ENVOLVENTE MII	0.492	0.000	1.910	0.000	-0.751	0	-29.879
N+1.83	B26	ENVOLVENTE MII	0.574	0.000	2.100	0.000	-0.751	0	-31.588
N+1.83	B26	ENVOLVENTE MII	0.656	0.000	2.270	0.000	-0.751	0	-33.333
N+1.83	B26	ENVOLVENTE MII	0.738	0.000	2.430	0.000	-0.751	0	-35.106
N+1.83	B26	ENVOLVENTE MII	0.820	0.000	2.560	0.000	-0.751	0	-36.901
N+1.83	B27	ENVOLVENTE MAI	0.000	0.000	-0.270	0.000	0.648	0	0.386
N+1.83	B27	ENVOLVENTE MAI	0.083	0.000	-0.140	0.000	0.648	0	0.403
N+1.83	B27	ENVOLVENTE MAI	0.166	0.000	0.020	0.000	0.648	0	0.409
N+1.83	B27	ENVOLVENTE MAI	0.249	0.000	0.190	0.000	0.648	0	0.401
N+1.83	B27	ENVOLVENTE MAI	0.332	0.000	0.380	0.000	0.648	0	0.378
N+1.83	B27	ENVOLVENTE MAI	0.415	0.000	0.600	0.000	0.648	0	0.339
N+1.83	B27	ENVOLVENTE MAI	0.498	0.000	0.820	0.000	0.648	0	0.282
N+1.83	B27	ENVOLVENTE MAI	0.581	0.000	1.010	0.000	0.648	0	0.209
N+1.83	B27	ENVOLVENTE MAI	0.664	0.000	1.190	0.000	0.648	0	0.133
N+1.83	B27	ENVOLVENTE MAI	0.747	0.000	1.340	0.000	0.648	0	0.058
N+1.83	B27	ENVOLVENTE MAI	0.830	0.000	1.470	0.000	0.648	0	0.434
N+1.83	B27	ENVOLVENTE MII	0.000	0.000	-26.480	0.000	-1.029	0	-20.468
N+1.83	B27	ENVOLVENTE MII	0.083	0.000	-26.280	0.000	-1.029	0	-18.279
N+1.83	B27	ENVOLVENTE MII	0.166	0.000	-26.030	0.000	-1.029	0	-16.108
N+1.83	B27	ENVOLVENTE MII	0.249	0.000	-25.710	0.000	-1.029	0	-13.961
N+1.83	B27	ENVOLVENTE MII	0.332	0.000	-25.330	0.000	-1.029	0	-11.843
N+1.83	B27	ENVOLVENTE MII	0.415	0.000	-24.890	0.000	-1.029	0	-9.76
N+1.83	B27	ENVOLVENTE MII	0.498	0.000	-24.440	0.000	-1.029	0	-7.716
N+1.83	B27	ENVOLVENTE MII	0.581	0.000	-24.060	0.000	-1.029	0	-5.706
N+1.83	B27	ENVOLVENTE MII	0.664	0.000	-23.740	0.000	-1.029	0	-3.738
N+1.83	B27	ENVOLVENTE MII	0.747	0.000	-23.490	0.000	-1.029	0	-1.808
N+1.83	B27	ENVOLVENTE MII	0.830	0.000	-23.300	0.000	-1.029	0	-0.359
N+1.83	B28	ENVOLVENTE MAI	0.000	0.000	23.920	0.000	1.061	0	-1.385
N+1.83	B28	ENVOLVENTE MAI	0.083	0.000	24.110	0.000	1.061	0	-1.574
N+1.83	B28	ENVOLVENTE MAI	0.166	0.000	24.370	0.000	1.061	0	-1.687
N+1.83	B28	ENVOLVENTE MAI	0.249	0.000	24.680	0.000	1.061	0	-1.77
N+1.83	B28	ENVOLVENTE MAI	0.332	0.000	25.060	0.000	1.061	0	-1.843
N+1.83	B28	ENVOLVENTE MAI	0.415	0.000	25.510	0.000	1.061	0	-1.917
N+1.83	B28	ENVOLVENTE MAI	0.498	0.000	25.950	0.000	1.061	0	-1.997
N+1.83	B28	ENVOLVENTE MAI	0.581	0.000	26.330	0.000	1.061	0	-2.085
N+1.83	B28	ENVOLVENTE MAI	0.664	0.000	26.650	0.000	1.061	0	-2.182
N+1.83	B28	ENVOLVENTE MAI	0.747	0.000	26.900	0.000	1.061	0	-2.283
N+1.83	B28	ENVOLVENTE MAI	0.830	0.000	27.100	0.000	1.061	0	-2.384
N+1.83	B28	ENVOLVENTE MII	0.000	0.000	-2.260	0.000	-1.201	0	-12.691
N+1.83	B28	ENVOLVENTE MII	0.083	0.000	-2.120	0.000	-1.201	0	-14.313
N+1.83	B28	ENVOLVENTE MII	0.166	0.000	-1.970	0.000	-1.201	0	-16.041
N+1.83	B28	ENVOLVENTE MII	0.249	0.000	-1.800	0.000	-1.201	0	-17.837
N+1.83	B28	ENVOLVENTE MII	0.332	0.000	-1.600	0.000	-1.201	0	-19.686
N+1.83	B28	ENVOLVENTE MII	0.415	0.000	-1.390	0.000	-1.201	0	-21.587
N+1.83	B28	ENVOLVENTE MII	0.498	0.000	-1.170	0.000	-1.201	0	-23.537
N+1.83	B28	ENVOLVENTE MII	0.581	0.000	-0.980	0.000	-1.201	0	-25.53
N+1.83	B28	ENVOLVENTE MII	0.664	0.000	-0.800	0.000	-1.201	0	-27.558
N+1.83	B28	ENVOLVENTE MII	0.747	0.000	-0.650	0.000	-1.201	0	-29.62

N+1.83	B28	ENVOLVENTE MII	0.830	0.000	-0.520	0.000	-1.201	0	-31.712
N+1.83	B29	ENVOLVENTE MAI	0.000	0.000	-0.320	0.000	1.341	0	-0.089
N+1.83	B29	ENVOLVENTE MAI	0.082	0.000	-0.190	0.000	1.341	0	-0.065
N+1.83	B29	ENVOLVENTE MAI	0.164	0.000	-0.040	0.000	1.341	0	-0.052
N+1.83	B29	ENVOLVENTE MAI	0.246	0.000	0.130	0.000	1.341	0	-0.051
N+1.83	B29	ENVOLVENTE MAI	0.328	0.000	0.320	0.000	1.341	0	-0.062
N+1.83	B29	ENVOLVENTE MAI	0.410	0.000	0.530	0.000	1.341	0	-0.086
N+1.83	B29	ENVOLVENTE MAI	0.492	0.000	0.750	0.000	1.341	0	-0.119
N+1.83	B29	ENVOLVENTE MAI	0.574	0.000	0.940	0.000	1.341	0	-0.15
N+1.83	B29	ENVOLVENTE MAI	0.656	0.000	1.110	0.000	1.341	0	-0.157
N+1.83	B29	ENVOLVENTE MAI	0.738	0.000	1.260	0.000	1.341	0	0.085
N+1.83	B29	ENVOLVENTE MAI	0.820	0.000	1.390	0.000	1.341	0	0.848
N+1.83	B29	ENVOLVENTE MII	0.000	0.000	-26.140	0.000	-1.168	0	-19.752
N+1.83	B29	ENVOLVENTE MII	0.082	0.000	-25.950	0.000	-1.168	0	-17.619
N+1.83	B29	ENVOLVENTE MII	0.164	0.000	-25.700	0.000	-1.168	0	-15.505
N+1.83	B29	ENVOLVENTE MII	0.246	0.000	-25.380	0.000	-1.168	0	-13.415
N+1.83	B29	ENVOLVENTE MII	0.328	0.000	-25.010	0.000	-1.168	0	-11.356
N+1.83	B29	ENVOLVENTE MII	0.410	0.000	-24.580	0.000	-1.168	0	-9.333
N+1.83	B29	ENVOLVENTE MII	0.492	0.000	-24.140	0.000	-1.168	0	-7.356
N+1.83	B29	ENVOLVENTE MII	0.574	0.000	-23.770	0.000	-1.168	0	-5.43
N+1.83	B29	ENVOLVENTE MII	0.656	0.000	-23.460	0.000	-1.168	0	-3.571
N+1.83	B29	ENVOLVENTE MII	0.738	0.000	-23.200	0.000	-1.168	0	-1.998
N+1.83	B29	ENVOLVENTE MII	0.820	0.000	-23.010	0.000	-1.168	0	-0.975
N+1.83	B30	ENVOLVENTE MAI	0.000	0.000	10.260	0.000	0.918	0	13.53
N+1.83	B30	ENVOLVENTE MAI	0.082	0.000	10.450	0.000	0.918	0	13.488
N+1.83	B30	ENVOLVENTE MAI	0.164	0.000	10.700	0.000	0.918	0	13.481
N+1.83	B30	ENVOLVENTE MAI	0.246	0.000	11.010	0.000	0.918	0	13.491
N+1.83	B30	ENVOLVENTE MAI	0.328	0.000	11.390	0.000	0.918	0	13.498
N+1.83	B30	ENVOLVENTE MAI	0.410	0.000	11.820	0.000	0.918	0	13.497
N+1.83	B30	ENVOLVENTE MAI	0.492	0.000	12.260	0.000	0.918	0	13.483
N+1.83	B30	ENVOLVENTE MAI	0.574	0.000	12.630	0.000	0.918	0	13.457
N+1.83	B30	ENVOLVENTE MAI	0.656	0.000	12.940	0.000	0.918	0	13.418
N+1.83	B30	ENVOLVENTE MAI	0.738	0.000	13.190	0.000	0.918	0	13.369
N+1.83	B30	ENVOLVENTE MAI	0.820	0.000	13.380	0.000	0.918	0	13.309
N+1.83	B30	ENVOLVENTE MII	0.000	0.000	-6.150	0.000	-1.199	0	-23.82
N+1.83	B30	ENVOLVENTE MII	0.082	0.000	-6.020	0.000	-1.199	0	-24.127
N+1.83	B30	ENVOLVENTE MII	0.164	0.000	-5.870	0.000	-1.199	0	-24.5
N+1.83	B30	ENVOLVENTE MII	0.246	0.000	-5.700	0.000	-1.199	0	-24.925
N+1.83	B30	ENVOLVENTE MII	0.328	0.000	-5.510	0.000	-1.199	0	-25.391
N+1.83	B30	ENVOLVENTE MII	0.410	0.000	-5.300	0.000	-1.199	0	-25.897
N+1.83	B30	ENVOLVENTE MII	0.492	0.000	-5.080	0.000	-1.199	0	-26.445
N+1.83	B30	ENVOLVENTE MII	0.574	0.000	-4.890	0.000	-1.199	0	-27.031
N+1.83	B30	ENVOLVENTE MII	0.656	0.000	-4.720	0.000	-1.199	0	-27.647
N+1.83	B30	ENVOLVENTE MII	0.738	0.000	-4.570	0.000	-1.199	0	-28.289
N+1.83	B30	ENVOLVENTE MII	0.820	0.000	-4.440	0.000	-1.199	0	-28.95
N+1.83	B31	ENVOLVENTE MAI	0.000	0.000	6.280	0.000	0.054	0	5.669
N+1.83	B31	ENVOLVENTE MAI	0.083	0.000	6.410	0.000	0.054	0	5.143
N+1.83	B31	ENVOLVENTE MAI	0.166	0.000	6.560	0.000	0.054	0	4.605
N+1.83	B31	ENVOLVENTE MAI	0.249	0.000	6.740	0.000	0.054	0	4.054
N+1.83	B31	ENVOLVENTE MAI	0.332	0.000	6.930	0.000	0.054	0	3.488
N+1.83	B31	ENVOLVENTE MAI	0.415	0.000	7.300	0.000	0.054	0	2.905
N+1.83	B31	ENVOLVENTE MAI	0.498	0.000	7.740	0.000	0.054	0	2.305
N+1.83	B31	ENVOLVENTE MAI	0.581	0.000	8.120	0.000	0.054	0	1.688
N+1.83	B31	ENVOLVENTE MAI	0.664	0.000	8.440	0.000	0.054	0	1.057
N+1.83	B31	ENVOLVENTE MAI	0.747	0.000	8.700	0.000	0.054	0	0.416
N+1.83	B31	ENVOLVENTE MAI	0.830	0.000	8.890	0.000	0.054	0	-0.132
N+1.83	B31	ENVOLVENTE MII	0.000	0.000	-8.720	0.000	-1.486	0	-7.163
N+1.83	B31	ENVOLVENTE MII	0.083	0.000	-8.520	0.000	-1.486	0	-6.447
N+1.83	B31	ENVOLVENTE MII	0.166	0.000	-8.270	0.000	-1.486	0	-5.751
N+1.83	B31	ENVOLVENTE MII	0.249	0.000	-7.950	0.000	-1.486	0	-5.078
N+1.83	B31	ENVOLVENTE MII	0.332	0.000	-7.570	0.000	-1.486	0	-4.434
N+1.83	B31	ENVOLVENTE MII	0.415	0.000	-7.280	0.000	-1.486	0	-3.825
N+1.83	B31	ENVOLVENTE MII	0.498	0.000	-7.060	0.000	-1.486	0	-3.254
N+1.83	B31	ENVOLVENTE MII	0.581	0.000	-6.870	0.000	-1.486	0	-2.718
N+1.83	B31	ENVOLVENTE MII	0.664	0.000	-6.700	0.000	-1.486	0	-2.212
N+1.83	B31	ENVOLVENTE MII	0.747	0.000	-6.540	0.000	-1.486	0	-1.734
N+1.83	B31	ENVOLVENTE MII	0.830	0.000	-6.410	0.000	-1.486	0	-1.379
N+1.83	B32	ENVOLVENTE MAI	0.000	0.000	4.700	0.000	1.379	0	3.631
N+1.83	B32	ENVOLVENTE MAI	0.082	0.000	4.830	0.000	1.379	0	3.241
N+1.83	B32	ENVOLVENTE MAI	0.164	0.000	4.980	0.000	1.379	0	2.841
N+1.83	B32	ENVOLVENTE MAI	0.246	0.000	5.150	0.000	1.379	0	2.428
N+1.83	B32	ENVOLVENTE MAI	0.328	0.000	5.340	0.000	1.379	0	2
N+1.83	B32	ENVOLVENTE MAI	0.410	0.000	5.560	0.000	1.379	0	1.557
N+1.83	B32	ENVOLVENTE MAI	0.492	0.000	5.770	0.000	1.379	0	1.099
N+1.83	B32	ENVOLVENTE MAI	0.574	0.000	5.960	0.000	1.379	0	0.631
N+1.83	B32	ENVOLVENTE MAI	0.656	0.000	6.130	0.000	1.379	0	0.163



N+1.83	B32	ENVOLVENTE MAI	0.738	0.000	6.280	0.000	1.379	0	-0.202
N+1.83	B32	ENVOLVENTE MAI	0.820	0.000	6.410	0.000	1.379	0	0.054
N+1.83	B32	ENVOLVENTE MII	0.000	0.000	-12.010	0.000	0.132	0	-9.077
N+1.83	B32	ENVOLVENTE MII	0.082	0.000	-11.820	0.000	0.132	0	-8.101
N+1.83	B32	ENVOLVENTE MII	0.164	0.000	-11.570	0.000	0.132	0	-7.143
N+1.83	B32	ENVOLVENTE MII	0.246	0.000	-11.260	0.000	0.132	0	-6.208
N+1.83	B32	ENVOLVENTE MII	0.328	0.000	-10.890	0.000	0.132	0	-5.303
N+1.83	B32	ENVOLVENTE MII	0.410	0.000	-10.450	0.000	0.132	0	-4.431
N+1.83	B32	ENVOLVENTE MII	0.492	0.000	-10.020	0.000	0.132	0	-3.599
N+1.83	B32	ENVOLVENTE MII	0.574	0.000	-9.640	0.000	0.132	0	-2.806
N+1.83	B32	ENVOLVENTE MII	0.656	0.000	-9.330	0.000	0.132	0	-2.056
N+1.83	B32	ENVOLVENTE MII	0.738	0.000	-9.080	0.000	0.132	0	-1.446
N+1.83	B32	ENVOLVENTE MII	0.820	0.000	-8.890	0.000	0.132	0	-1.486
N+1.83	B33	ENVOLVENTE MAI	0.000	0.000	11.190	0.000	0.824	0	-2.608
N+1.83	B33	ENVOLVENTE MAI	0.083	0.000	11.390	0.000	0.824	0	-2.708
N+1.83	B33	ENVOLVENTE MAI	0.166	0.000	11.640	0.000	0.824	0	-2.731
N+1.83	B33	ENVOLVENTE MAI	0.249	0.000	11.960	0.000	0.824	0	-2.72
N+1.83	B33	ENVOLVENTE MAI	0.332	0.000	12.340	0.000	0.824	0	-2.662
N+1.83	B33	ENVOLVENTE MAI	0.415	0.000	12.780	0.000	0.824	0	-2.438
N+1.83	B33	ENVOLVENTE MAI	0.498	0.000	13.230	0.000	0.824	0	-2.03
N+1.83	B33	ENVOLVENTE MAI	0.581	0.000	13.610	0.000	0.824	0	-1.633
N+1.83	B33	ENVOLVENTE MAI	0.664	0.000	13.920	0.000	0.824	0	-1.247
N+1.83	B33	ENVOLVENTE MAI	0.747	0.000	14.180	0.000	0.824	0	-0.871
N+1.83	B33	ENVOLVENTE MAI	0.830	0.000	14.370	0.000	0.824	0	-0.503
N+1.83	B33	ENVOLVENTE MII	0.000	0.000	-6.420	0.000	-0.339	0	-14.895
N+1.83	B33	ENVOLVENTE MII	0.083	0.000	-6.290	0.000	-0.339	0	-15.204
N+1.83	B33	ENVOLVENTE MII	0.166	0.000	-6.130	0.000	-0.339	0	-15.621
N+1.83	B33	ENVOLVENTE MII	0.249	0.000	-5.960	0.000	-0.339	0	-16.108
N+1.83	B33	ENVOLVENTE MII	0.332	0.000	-5.760	0.000	-0.339	0	-16.688
N+1.83	B33	ENVOLVENTE MII	0.415	0.000	-5.550	0.000	-0.339	0	-17.484
N+1.83	B33	ENVOLVENTE MII	0.498	0.000	-5.330	0.000	-0.339	0	-18.52
N+1.83	B33	ENVOLVENTE MII	0.581	0.000	-5.140	0.000	-0.339	0	-19.597
N+1.83	B33	ENVOLVENTE MII	0.664	0.000	-4.960	0.000	-0.339	0	-20.707
N+1.83	B33	ENVOLVENTE MII	0.747	0.000	-4.810	0.000	-0.339	0	-21.844
N+1.83	B33	ENVOLVENTE MII	0.830	0.000	-4.680	0.000	-0.339	0	-23.003
N+1.83	B34	ENVOLVENTE MAI	0.000	0.000	96.590	0.000	12.518	0	-1.869
N+1.83	B34	ENVOLVENTE MAI	0.083	0.000	97.080	0.000	12.518	0	-3.986
N+1.83	B34	ENVOLVENTE MAI	0.166	0.000	97.700	0.000	12.518	0	-5.966
N+1.83	B34	ENVOLVENTE MAI	0.249	0.000	98.450	0.000	12.518	0	-7.871
N+1.83	B34	ENVOLVENTE MAI	0.332	0.000	99.310	0.000	12.518	0	-9.74
N+1.83	B34	ENVOLVENTE MAI	0.415	0.000	100.310	0.000	12.518	0	-11.599
N+1.83	B34	ENVOLVENTE MAI	0.498	0.000	101.300	0.000	12.518	0	-13.466
N+1.83	B34	ENVOLVENTE MAI	0.581	0.000	102.170	0.000	12.518	0	-15.348
N+1.83	B34	ENVOLVENTE MAI	0.664	0.000	102.910	0.000	12.518	0.000	-17.248
N+1.83	B34	ENVOLVENTE MAI	0.747	0.000	103.530	0.000	12.518	0.000	-19.166
N+1.83	B34	ENVOLVENTE MAI	0.830	0.000	104.020	0.000	12.518	0.000	-21.103
N+1.83	B34	ENVOLVENTE MII	0.000	0.000	18.180	0.000	-18.236	0.000	-24.920
N+1.83	B34	ENVOLVENTE MII	0.083	0.000	18.530	0.000	-18.236	0.000	-32.362
N+1.83	B34	ENVOLVENTE MII	0.166	0.000	18.910	0.000	-18.236	0.000	-40.018
N+1.83	B34	ENVOLVENTE MII	0.249	0.000	19.340	0.000	-18.236	0.000	-47.840
N+1.83	B34	ENVOLVENTE MII	0.332	0.000	19.810	0.000	-18.236	0.000	-55.802
N+1.83	B34	ENVOLVENTE MII	0.415	0.000	20.330	0.000	-18.236	0.000	-63.892
N+1.83	B34	ENVOLVENTE MII	0.498	0.000	20.840	0.000	-18.236	0.000	-72.101
N+1.83	B34	ENVOLVENTE MII	0.581	0.000	21.310	0.000	-18.236	0.000	-80.414
N+1.83	B34	ENVOLVENTE MII	0.664	0.000	21.740	0.000	-18.236	0.000	-88.813
N+1.83	B34	ENVOLVENTE MII	0.747	0.000	22.120	0.000	-18.236	0.000	-97.283
N+1.83	B34	ENVOLVENTE MII	0.830	0.000	22.470	0.000	-18.236	0.000	-105.811
N+1.83	B35	ENVOLVENTE MAI	0.000	0.000	2.920	0.000	21.834	0.000	5.000
N+1.83	B35	ENVOLVENTE MAI	0.082	0.000	3.260	0.000	21.834	0.000	4.746
N+1.83	B35	ENVOLVENTE MAI	0.164	0.000	3.640	0.000	21.834	0.000	4.464
N+1.83	B35	ENVOLVENTE MAI	0.246	0.000	4.060	0.000	21.834	0.000	4.148
N+1.83	B35	ENVOLVENTE MAI	0.328	0.000	4.530	0.000	21.834	0.000	3.797
N+1.83	B35	ENVOLVENTE MAI	0.410	0.000	5.030	0.000	21.834	0.000	3.406
N+1.83	B35	ENVOLVENTE MAI	0.492	0.000	5.540	0.000	21.834	0.000	2.972
N+1.83	B35	ENVOLVENTE MAI	0.574	0.000	6.000	0.000	21.834	0.000	2.500
N+1.83	B35	ENVOLVENTE MAI	0.656	0.000	6.420	0.000	21.834	0.000	1.992
N+1.83	B35	ENVOLVENTE MAI	0.738	0.000	6.800	0.000	21.834	0.000	1.541
N+1.83	B35	ENVOLVENTE MAI	0.820	0.000	7.140	0.000	21.834	0.000	1.337
N+1.83	B35	ENVOLVENTE MII	0.000	0.000	-25.830	0.000	-7.687	0.000	-17.905
N+1.83	B35	ENVOLVENTE MII	0.082	0.000	-25.340	0.000	-7.687	0.000	-15.807
N+1.83	B35	ENVOLVENTE MII	0.164	0.000	-24.730	0.000	-7.687	0.000	-13.753
N+1.83	B35	ENVOLVENTE MII	0.246	0.000	-24.000	0.000	-7.687	0.000	-11.754
N+1.83	B35	ENVOLVENTE MII	0.328	0.000	-23.150	0.000	-7.687	0.000	-9.820
N+1.83	B35	ENVOLVENTE MII	0.410	0.000	-22.170	0.000	-7.687	0.000	-7.962
N+1.83	B35	ENVOLVENTE MII	0.492	0.000	-21.200	0.000	-7.687	0.000	-6.185
N+1.83	B35	ENVOLVENTE MII	0.574	0.000	-20.350	0.000	-7.687	0.000	-4.483

N+1.83	B35	ENVOLVENTE MII	0.656	0.000	-19.620	0.000	-7.687	0.000	-2.847
N+1.83	B35	ENVOLVENTE MII	0.738	0.000	-19.010	0.000	-7.687	0.000	-1.356
N+1.83	B35	ENVOLVENTE MII	0.820	0.000	-18.520	0.000	-7.687	0.000	-0.186
N+1.83	B36	ENVOLVENTE MAI	0.000	0.000	105.940	0.000	20.397	0.000	47.362
N+1.83	B36	ENVOLVENTE MAI	0.082	0.000	106.430	0.000	20.397	0.000	46.858
N+1.83	B36	ENVOLVENTE MAI	0.164	0.000	107.040	0.000	20.397	0.000	46.342
N+1.83	B36	ENVOLVENTE MAI	0.246	0.000	107.770	0.000	20.397	0.000	45.823
N+1.83	B36	ENVOLVENTE MAI	0.328	0.000	108.620	0.000	20.397	0.000	45.321
N+1.83	B36	ENVOLVENTE MAI	0.410	0.000	109.600	0.000	20.397	0.000	44.875
N+1.83	B36	ENVOLVENTE MAI	0.492	0.000	110.570	0.000	20.397	0.000	44.446
N+1.83	B36	ENVOLVENTE MAI	0.574	0.000	111.420	0.000	20.397	0.000	44.018
N+1.83	B36	ENVOLVENTE MAI	0.656	0.000	112.160	0.000	20.397	0.000	43.577
N+1.83	B36	ENVOLVENTE MAI	0.738	0.000	112.760	0.000	20.397	0.000	43.117
N+1.83	B36	ENVOLVENTE MAI	0.820	0.000	113.250	0.000	20.397	0.000	42.635
N+1.83	B36	ENVOLVENTE MII	0.000	0.000	1.540	0.000	-10.812	0.000	-55.142
N+1.83	B36	ENVOLVENTE MII	0.082	0.000	1.880	0.000	-10.812	0.000	-63.484
N+1.83	B36	ENVOLVENTE MII	0.164	0.000	2.260	0.000	-10.812	0.000	-71.888
N+1.83	B36	ENVOLVENTE MII	0.246	0.000	2.680	0.000	-10.812	0.000	-80.378
N+1.83	B36	ENVOLVENTE MII	0.328	0.000	3.140	0.000	-10.812	0.000	-88.986
N+1.83	B36	ENVOLVENTE MII	0.410	0.000	3.650	0.000	-10.812	0.000	-97.763
N+1.83	B36	ENVOLVENTE MII	0.492	0.000	4.150	0.000	-10.812	0.000	-106.682
N+1.83	B36	ENVOLVENTE MII	0.574	0.000	4.610	0.000	-10.812	0.000	-115.716
N+1.83	B36	ENVOLVENTE MII	0.656	0.000	5.040	0.000	-10.812	0.000	-124.839
N+1.83	B36	ENVOLVENTE MII	0.738	0.000	5.420	0.000	-10.812	0.000	-134.030
N+1.83	B36	ENVOLVENTE MII	0.820	0.000	5.760	0.000	-10.812	0.000	-143.275
N+1.83	B37	ENVOLVENTE MAI	0.000	0.000	4.800	0.000	-2.726	0.000	6.666
N+1.83	B37	ENVOLVENTE MAI	0.083	0.000	5.140	0.000	-2.726	0.000	6.254
N+1.83	B37	ENVOLVENTE MAI	0.166	0.000	5.530	0.000	-2.726	0.000	5.812
N+1.83	B37	ENVOLVENTE MAI	0.249	0.000	5.960	0.000	-2.726	0.000	5.336
N+1.83	B37	ENVOLVENTE MAI	0.332	0.000	6.430	0.000	-2.726	0.000	4.823
N+1.83	B37	ENVOLVENTE MAI	0.415	0.000	6.940	0.000	-2.726	0.000	4.269
N+1.83	B37	ENVOLVENTE MAI	0.498	0.000	7.450	0.000	-2.726	0.000	3.672
N+1.83	B37	ENVOLVENTE MAI	0.581	0.000	7.920	0.000	-2.726	0.000	3.035
N+1.83	B37	ENVOLVENTE MAI	0.664	0.000	8.350	0.000	-2.726	0.000	2.362
N+1.83	B37	ENVOLVENTE MAI	0.747	0.000	8.740	0.000	-2.726	0.000	1.660
N+1.83	B37	ENVOLVENTE MAI	0.830	0.000	9.080	0.000	-2.726	0.000	1.255
N+1.83	B37	ENVOLVENTE MII	0.000	0.000	-33.520	0.000	-15.334	0.000	-24.616
N+1.83	B37	ENVOLVENTE MII	0.083	0.000	-33.030	0.000	-15.334	0.000	-21.854
N+1.83	B37	ENVOLVENTE MII	0.166	0.000	-32.410	0.000	-15.334	0.000	-19.138
N+1.83	B37	ENVOLVENTE MII	0.249	0.000	-31.670	0.000	-15.334	0.000	-16.478
N+1.83	B37	ENVOLVENTE MII	0.332	0.000	-30.800	0.000	-15.334	0.000	-13.886
N+1.83	B37	ENVOLVENTE MII	0.415	0.000	-29.800	0.000	-15.334	0.000	-11.371
N+1.83	B37	ENVOLVENTE MII	0.498	0.000	-28.810	0.000	-15.334	0.000	-8.940
N+1.83	B37	ENVOLVENTE MII	0.581	0.000	-27.940	0.000	-15.334	0.000	-6.587
N+1.83	B37	ENVOLVENTE MII	0.664	0.000	-27.200	0.000	-15.334	0.000	-4.303
N+1.83	B37	ENVOLVENTE MII	0.747	0.000	-26.580	0.000	-15.334	0.000	-2.079
N+1.83	B37	ENVOLVENTE MII	0.830	0.000	-26.090	0.000	-15.334	0.000	-0.229
N+2.64	B40	ENVOLVENTE MAI	0.000	0.000	4.960	0.000	1.897	0.000	0.503
N+2.64	B40	ENVOLVENTE MAI	0.083	0.000	5.150	0.000	1.897	0.000	0.148
N+2.64	B40	ENVOLVENTE MAI	0.166	0.000	5.400	0.000	1.897	0.000	0.232
N+2.64	B40	ENVOLVENTE MAI	0.249	0.000	5.720	0.000	1.897	0.000	0.616
N+2.64	B40	ENVOLVENTE MAI	0.332	0.000	6.100	0.000	1.897	0.000	1.002
N+2.64	B40	ENVOLVENTE MAI	0.415	0.000	6.550	0.000	1.897	0.000	1.373
N+2.64	B40	ENVOLVENTE MAI	0.498	0.000	6.990	0.000	1.897	0.000	1.726
N+2.64	B40	ENVOLVENTE MAI	0.581	0.000	7.370	0.000	1.897	0.000	2.063
N+2.64	B40	ENVOLVENTE MAI	0.664	0.000	7.690	0.000	1.897	0.000	2.385
N+2.64	B40	ENVOLVENTE MAI	0.747	0.000	7.940	0.000	1.897	0.000	2.693
N+2.64	B40	ENVOLVENTE MAI	0.830	0.000	8.140	0.000	1.897	0.000	2.990
N+2.64	B40	ENVOLVENTE MII	0.000	0.000	-5.250	0.000	-2.054	0.000	-1.010
N+2.64	B40	ENVOLVENTE MII	0.083	0.000	-5.120	0.000	-2.054	0.000	-0.644
N+2.64	B40	ENVOLVENTE MII	0.166	0.000	-4.970	0.000	-2.054	0.000	-0.747
N+2.64	B40	ENVOLVENTE MII	0.249	0.000	-4.790	0.000	-2.054	0.000	-1.187
N+2.64	B40	ENVOLVENTE MII	0.332	0.000	-4.600	0.000	-2.054	0.000	-1.673
N+2.64	B40	ENVOLVENTE MII	0.415	0.000	-4.380	0.000	-2.054	0.000	-2.196
N+2.64	B40	ENVOLVENTE MII	0.498	0.000	-4.170	0.000	-2.054	0.000	-2.757
N+2.64	B40	ENVOLVENTE MII	0.581	0.000	-3.970	0.000	-2.054	0.000	-3.353
N+2.64	B40	ENVOLVENTE MII	0.664	0.000	-3.800	0.000	-2.054	0.000	-3.978
N+2.64	B40	ENVOLVENTE MII	0.747	0.000	-3.640	0.000	-2.054	0.000	-4.626
N+2.64	B40	ENVOLVENTE MII	0.830	0.000	-3.510	0.000	-2.054	0.000	-5.294
N+2.64	B41	ENVOLVENTE MAI	0.000	0.000	3.670	0.000	2.115	0.000	3.056
N+2.64	B41	ENVOLVENTE MAI	0.082	0.000	3.800	0.000	2.115	0.000	2.750
N+2.64	B41	ENVOLVENTE MAI	0.164	0.000	3.950	0.000	2.115	0.000	2.433
N+2.64	B41	ENVOLVENTE MAI	0.246	0.000	4.120	0.000	2.115	0.000	2.103
N+2.64	B41	ENVOLVENTE MAI	0.328	0.000	4.310	0.000	2.115	0.000	1.758
N+2.64	B41	ENVOLVENTE MAI	0.410	0.000	4.520	0.000	2.115	0.000	1.397
N+2.64	B41	ENVOLVENTE MAI	0.492	0.000	4.740	0.000	2.115	0.000	1.019



N+2.64	B41	ENVOLVENTE MAI	0.574	0.000	4.930	0.000	2.115	0.000	0.626
N+2.64	B41	ENVOLVENTE MAI	0.656	0.000	5.100	0.000	2.115	0.000	0.235
N+2.64	B41	ENVOLVENTE MAI	0.738	0.000	5.250	0.000	2.115	0.000	0.149
N+2.64	B41	ENVOLVENTE MAI	0.820	0.000	5.380	0.000	2.115	0.000	0.508
N+2.64	B41	ENVOLVENTE MII	0.000	0.000	-8.240	0.000	-1.883	0.000	-5.321
N+2.64	B41	ENVOLVENTE MII	0.082	0.000	-8.050	0.000	-1.883	0.000	-4.653
N+2.64	B41	ENVOLVENTE MII	0.164	0.000	-7.800	0.000	-1.883	0.000	-4.003
N+2.64	B41	ENVOLVENTE MII	0.246	0.000	-7.490	0.000	-1.883	0.000	-3.376
N+2.64	B41	ENVOLVENTE MII	0.328	0.000	-7.120	0.000	-1.883	0.000	-2.777
N+2.64	B41	ENVOLVENTE MII	0.410	0.000	-6.680	0.000	-1.883	0.000	-2.212
N+2.64	B41	ENVOLVENTE MII	0.492	0.000	-6.250	0.000	-1.883	0.000	-1.684
N+2.64	B41	ENVOLVENTE MII	0.574	0.000	-5.870	0.000	-1.883	0.000	-1.191
N+2.64	B41	ENVOLVENTE MII	0.656	0.000	-5.560	0.000	-1.883	0.000	-0.743
N+2.64	B41	ENVOLVENTE MII	0.738	0.000	-5.310	0.000	-1.883	0.000	-0.636
N+2.64	B41	ENVOLVENTE MII	0.820	0.000	-5.120	0.000	-1.883	0.000	-1.003
N+2.64	B42	ENVOLVENTE MAI	0.000	0.000	6.390	0.000	2.059	0.000	0.717
N+2.64	B42	ENVOLVENTE MAI	0.083	0.000	6.520	0.000	2.059	0.000	0.298
N+2.64	B42	ENVOLVENTE MAI	0.166	0.000	6.680	0.000	2.059	0.000	0.486
N+2.64	B42	ENVOLVENTE MAI	0.249	0.000	6.850	0.000	2.059	0.000	1.059
N+2.64	B42	ENVOLVENTE MAI	0.332	0.000	7.210	0.000	2.059	0.000	1.643
N+2.64	B42	ENVOLVENTE MAI	0.415	0.000	7.660	0.000	2.059	0.000	2.216
N+2.64	B42	ENVOLVENTE MAI	0.498	0.000	8.100	0.000	2.059	0.000	2.772
N+2.64	B42	ENVOLVENTE MAI	0.581	0.000	8.480	0.000	2.059	0.000	3.312
N+2.64	B42	ENVOLVENTE MAI	0.664	0.000	8.800	0.000	2.059	0.000	3.837
N+2.64	B42	ENVOLVENTE MAI	0.747	0.000	9.050	0.000	2.059	0.000	4.349
N+2.64	B42	ENVOLVENTE MAI	0.830	0.000	9.240	0.000	2.059	0.000	4.849
N+2.64	B42	ENVOLVENTE MII	0.000	0.000	-8.040	0.000	-1.952	0.000	-1.199
N+2.64	B42	ENVOLVENTE MII	0.083	0.000	-7.850	0.000	-1.952	0.000	-0.655
N+2.64	B42	ENVOLVENTE MII	0.166	0.000	-7.590	0.000	-1.952	0.000	-0.750
N+2.64	B42	ENVOLVENTE MII	0.249	0.000	-7.280	0.000	-1.952	0.000	-1.267
N+2.64	B42	ENVOLVENTE MII	0.332	0.000	-7.060	0.000	-1.952	0.000	-1.838
N+2.64	B42	ENVOLVENTE MII	0.415	0.000	-6.850	0.000	-1.952	0.000	-2.451
N+2.64	B42	ENVOLVENTE MII	0.498	0.000	-6.630	0.000	-1.952	0.000	-3.102
N+2.64	B42	ENVOLVENTE MII	0.581	0.000	-6.440	0.000	-1.952	0.000	-3.788
N+2.64	B42	ENVOLVENTE MII	0.664	0.000	-6.260	0.000	-1.952	0.000	-4.504
N+2.64	B42	ENVOLVENTE MII	0.747	0.000	-6.110	0.000	-1.952	0.000	-5.244
N+2.64	B42	ENVOLVENTE MII	0.830	0.000	-5.980	0.000	-1.952	0.000	-6.002
N+2.64	B43	ENVOLVENTE MAI	0.000	0.000	5.650	0.000	1.991	0.000	4.563
N+2.64	B43	ENVOLVENTE MAI	0.082	0.000	5.780	0.000	1.991	0.000	4.096
N+2.64	B43	ENVOLVENTE MAI	0.164	0.000	5.930	0.000	1.991	0.000	3.618
N+2.64	B43	ENVOLVENTE MAI	0.246	0.000	6.100	0.000	1.991	0.000	3.127
N+2.64	B43	ENVOLVENTE MAI	0.328	0.000	6.290	0.000	1.991	0.000	2.622
N+2.64	B43	ENVOLVENTE MAI	0.410	0.000	6.500	0.000	1.991	0.000	2.101
N+2.64	B43	ENVOLVENTE MAI	0.492	0.000	6.720	0.000	1.991	0.000	1.563
N+2.64	B43	ENVOLVENTE MAI	0.574	0.000	6.910	0.000	1.991	0.000	1.016
N+2.64	B43	ENVOLVENTE MAI	0.656	0.000	7.210	0.000	1.991	0.000	0.481
N+2.64	B43	ENVOLVENTE MAI	0.738	0.000	7.460	0.000	1.991	0.000	0.313
N+2.64	B43	ENVOLVENTE MAI	0.820	0.000	7.650	0.000	1.991	0.000	0.717
N+2.64	B43	ENVOLVENTE MII	0.000	0.000	-8.920	0.000	-2.036	0.000	-5.704
N+2.64	B43	ENVOLVENTE MII	0.082	0.000	-8.730	0.000	-2.036	0.000	-4.981
N+2.64	B43	ENVOLVENTE MII	0.164	0.000	-8.480	0.000	-2.036	0.000	-4.277
N+2.64	B43	ENVOLVENTE MII	0.246	0.000	-8.160	0.000	-2.036	0.000	-3.596
N+2.64	B43	ENVOLVENTE MII	0.328	0.000	-7.790	0.000	-2.036	0.000	-2.944
N+2.64	B43	ENVOLVENTE MII	0.410	0.000	-7.360	0.000	-2.036	0.000	-2.326
N+2.64	B43	ENVOLVENTE MII	0.492	0.000	-6.920	0.000	-2.036	0.000	-1.746
N+2.64	B43	ENVOLVENTE MII	0.574	0.000	-6.550	0.000	-2.036	0.000	-1.205
N+2.64	B43	ENVOLVENTE MII	0.656	0.000	-6.370	0.000	-2.036	0.000	-0.720
N+2.64	B43	ENVOLVENTE MII	0.738	0.000	-6.220	0.000	-2.036	0.000	-0.638
N+2.64	B43	ENVOLVENTE MII	0.820	0.000	-6.090	0.000	-2.036	0.000	-1.157
N+2.64	B44	ENVOLVENTE MAI	0.000	0.000	4.780	0.000	22.068	0.000	21.310
N+2.64	B44	ENVOLVENTE MAI	0.165	0.000	5.510	0.000	22.068	0.000	21.599
N+2.64	B44	ENVOLVENTE MAI	0.330	0.000	6.400	0.000	22.068	0.000	21.674
N+2.64	B44	ENVOLVENTE MAI	0.495	0.000	7.440	0.000	22.068	0.000	21.469
N+2.64	B44	ENVOLVENTE MAI	0.660	0.000	8.490	0.000	22.068	0.000	20.979
N+2.64	B44	ENVOLVENTE MAI	0.825	0.000	9.550	0.000	22.068	0.000	21.349
N+2.64	B44	ENVOLVENTE MAI	0.990	0.000	10.610	0.000	22.068	0.000	22.256
N+2.64	B44	ENVOLVENTE MAI	1.155	0.000	11.670	0.000	22.068	0.000	22.751
N+2.64	B44	ENVOLVENTE MAI	1.320	0.000	12.940	0.000	22.068	0.000	23.784
N+2.64	B44	ENVOLVENTE MAI	1.485	0.000	14.540	0.000	22.068	0.000	25.567
N+2.64	B44	ENVOLVENTE MAI	1.650	0.000	15.640	0.000	22.068	0.000	27.133
N+2.64	B44	ENVOLVENTE MII	0.000	0.000	-26.860	0.000	-22.500	0.000	-6.787
N+2.64	B44	ENVOLVENTE MII	0.165	0.000	-25.760	0.000	-22.500	0.000	-3.574
N+2.64	B44	ENVOLVENTE MII	0.330	0.000	-24.160	0.000	-22.500	0.000	-0.505
N+2.64	B44	ENVOLVENTE MII	0.495	0.000	-22.130	0.000	-22.500	0.000	2.382
N+2.64	B44	ENVOLVENTE MII	0.660	0.000	-20.030	0.000	-22.500	0.000	5.036
N+2.64	B44	ENVOLVENTE MII	0.825	0.000	-17.940	0.000	-22.500	0.000	7.430



N+2.64	B44	ENVOLVENTE MII	0.990	0.000	-15.850	0.000	-22.500	0.000	8.767
N+2.64	B44	ENVOLVENTE MII	1.155	0.000	-13.760	0.000	-22.500	0.000	7.673
N+2.64	B44	ENVOLVENTE MII	1.320	0.000	-11.960	0.000	-22.500	0.000	5.690
N+2.64	B44	ENVOLVENTE MII	1.485	0.000	-11.060	0.000	-22.500	0.000	3.529
N+2.64	B44	ENVOLVENTE MII	1.650	0.000	-10.340	0.000	-22.500	0.000	1.230
N+2.64	B45	ENVOLVENTE MAI	0.000	0.000	4.660	0.000	2.144	0.000	9.458
N+2.64	B45	ENVOLVENTE MAI	0.165	0.000	4.940	0.000	2.144	0.000	9.188
N+2.64	B45	ENVOLVENTE MAI	0.330	0.000	5.300	0.000	2.144	0.000	8.826
N+2.64	B45	ENVOLVENTE MAI	0.495	0.000	5.740	0.000	2.144	0.000	8.335
N+2.64	B45	ENVOLVENTE MAI	0.660	0.000	6.190	0.000	2.144	0.000	7.720
N+2.64	B45	ENVOLVENTE MAI	0.825	0.000	6.650	0.000	2.144	0.000	7.476
N+2.64	B45	ENVOLVENTE MAI	0.990	0.000	7.100	0.000	2.144	0.000	7.877
N+2.64	B45	ENVOLVENTE MAI	1.155	0.000	7.550	0.000	2.144	0.000	9.160
N+2.64	B45	ENVOLVENTE MAI	1.320	0.000	8.190	0.000	2.144	0.000	10.347
N+2.64	B45	ENVOLVENTE MAI	1.485	0.000	8.880	0.000	2.144	0.000	11.463
N+2.64	B45	ENVOLVENTE MAI	1.650	0.000	9.330	0.000	2.144	0.000	12.557
N+2.64	B45	ENVOLVENTE MII	0.000	0.000	-14.320	0.000	-2.139	0.000	-5.666
N+2.64	B45	ENVOLVENTE MII	0.165	0.000	-13.880	0.000	-2.139	0.000	-3.856
N+2.64	B45	ENVOLVENTE MII	0.330	0.000	-13.180	0.000	-2.139	0.000	-2.102
N+2.64	B45	ENVOLVENTE MII	0.495	0.000	-12.270	0.000	-2.139	0.000	-0.420
N+2.64	B45	ENVOLVENTE MII	0.660	0.000	-11.330	0.000	-2.139	0.000	1.157
N+2.64	B45	ENVOLVENTE MII	0.825	0.000	-10.390	0.000	-2.139	0.000	2.509
N+2.64	B45	ENVOLVENTE MII	0.990	0.000	-9.440	0.000	-2.139	0.000	2.245
N+2.64	B45	ENVOLVENTE MII	1.155	0.000	-8.500	0.000	-2.139	0.000	1.225
N+2.64	B45	ENVOLVENTE MII	1.320	0.000	-7.790	0.000	-2.139	0.000	0.081
N+2.64	B45	ENVOLVENTE MII	1.485	0.000	-7.430	0.000	-2.139	0.000	-1.191
N+2.64	B45	ENVOLVENTE MII	1.650	0.000	-7.150	0.000	-2.139	0.000	-2.589
N+2.64	B46	ENVOLVENTE MAI	0.000	0.000	4.820	0.000	2.118	0.000	9.601
N+2.64	B46	ENVOLVENTE MAI	0.165	0.000	5.110	0.000	2.118	0.000	9.290
N+2.64	B46	ENVOLVENTE MAI	0.330	0.000	5.470	0.000	2.118	0.000	8.887
N+2.64	B46	ENVOLVENTE MAI	0.495	0.000	5.910	0.000	2.118	0.000	8.354
N+2.64	B46	ENVOLVENTE MAI	0.660	0.000	6.360	0.000	2.118	0.000	7.694
N+2.64	B46	ENVOLVENTE MAI	0.825	0.000	6.810	0.000	2.118	0.000	7.434
N+2.64	B46	ENVOLVENTE MAI	0.990	0.000	7.250	0.000	2.118	0.000	7.812
N+2.64	B46	ENVOLVENTE MAI	1.155	0.000	7.700	0.000	2.118	0.000	8.941
N+2.64	B46	ENVOLVENTE MAI	1.320	0.000	8.390	0.000	2.118	0.000	10.255
N+2.64	B46	ENVOLVENTE MAI	1.485	0.000	9.080	0.000	2.118	0.000	11.443
N+2.64	B46	ENVOLVENTE MAI	1.65	0	9.53	0	2.118	0	12.54
N+2.64	B46	ENVOLVENTE MII	0	0	-14.3	0	-2.2	0	-5.701
N+2.64	B46	ENVOLVENTE MII	0.165	0	-13.85	0	-2.2	0	-3.883
N+2.64	B46	ENVOLVENTE MII	0.33	0	-13.16	0	-2.2	0	-2.12
N+2.64	B46	ENVOLVENTE MII	0.495	0	-12.25	0	-2.2	0	-0.427
N+2.64	B46	ENVOLVENTE MII	0.66	0	-11.32	0	-2.2	0	1.166
N+2.64	B46	ENVOLVENTE MII	0.825	0	-10.38	0	-2.2	0	2.565
N+2.64	B46	ENVOLVENTE MII	0.99	0	-9.45	0	-2.2	0	2.375
N+2.64	B46	ENVOLVENTE MII	1.155	0	-8.51	0	-2.2	0	1.345
N+2.64	B46	ENVOLVENTE MII	1.32	0	-7.85	0	-2.2	0	0.051
N+2.64	B46	ENVOLVENTE MII	1.485	0	-7.49	0	-2.2	0	-1.317
N+2.64	B46	ENVOLVENTE MII	1.65	0	-7.21	0	-2.2	0	-2.741
N+3.45	B47	ENVOLVENTE MAI	0	0	47.41	0	21.116	0	3.275
N+3.45	B47	ENVOLVENTE MAI	0.083	0	47.87	0	21.116	0	2.919
N+3.45	B47	ENVOLVENTE MAI	0.166	0	48.39	0	21.116	0	2.778
N+3.45	B47	ENVOLVENTE MAI	0.249	0	48.98	0	21.116	0	2.609
N+3.45	B47	ENVOLVENTE MAI	0.332	0	49.63	0	21.116	0	2.41
N+3.45	B47	ENVOLVENTE MAI	0.415	0	50.34	0	21.116	0	2.178
N+3.45	B47	ENVOLVENTE MAI	0.498	0	51.06	0	21.116	0	1.912
N+3.45	B47	ENVOLVENTE MAI	0.581	0	51.7	0	21.116	0	1.612
N+3.45	B47	ENVOLVENTE MAI	0.664	0	52.29	0	21.116	0	1.28
N+3.45	B47	ENVOLVENTE MAI	0.747	0	52.82	0	21.116	0	0.918
N+3.45	B47	ENVOLVENTE MAI	0.83	0	53.28	0	21.116	0	0.528
N+3.45	B47	ENVOLVENTE MII	0	0	1.1	0	-6.635	0	-2.751
N+3.45	B47	ENVOLVENTE MII	0.083	0	1.44	0	-6.635	0	-6.454
N+3.45	B47	ENVOLVENTE MII	0.166	0	1.79	0	-6.635	0	-10.441
N+3.45	B47	ENVOLVENTE MII	0.249	0	2.17	0	-6.635	0	-14.477
N+3.45	B47	ENVOLVENTE MII	0.332	0	2.56	0	-6.635	0	-18.566
N+3.45	B47	ENVOLVENTE MII	0.415	0	2.98	0	-6.635	0	-22.712
N+3.45	B47	ENVOLVENTE MII	0.498	0	3.4	0	-6.635	0	-26.919
N+3.45	B47	ENVOLVENTE MII	0.581	0	3.79	0	-6.635	0	-31.183
N+3.45	B47	ENVOLVENTE MII	0.664	0	4.17	0	-6.635	0	-35.498
N+3.45	B47	ENVOLVENTE MII	0.747	0	4.52	0	-6.635	0	-39.859
N+3.45	B47	ENVOLVENTE MII	0.83	0	4.86	0	-6.635	0	-44.262
N+3.45	B48	ENVOLVENTE MAI	0	0	-4.83	0	6.628	0	0.577
N+3.45	B48	ENVOLVENTE MAI	0.082	0	-4.5	0	6.628	0	0.96
N+3.45	B48	ENVOLVENTE MAI	0.164	0	-4.15	0	6.628	0	1.316
N+3.45	B48	ENVOLVENTE MAI	0.246	0	-3.78	0	6.628	0	1.643
N+3.45	B48	ENVOLVENTE MAI	0.328	0	-3.39	0	6.628	0	1.938

N+3.45	B48	ENVOLVENTE MAI	0.41	0	-2.98	0	6.628	0	2.201
N+3.45	B48	ENVOLVENTE MAI	0.492	0	-2.57	0	6.628	0	2.43
N+3.45	B48	ENVOLVENTE MAI	0.574	0	-2.18	0	6.628	0	2.627
N+3.45	B48	ENVOLVENTE MAI	0.656	0	-1.81	0	6.628	0	2.794
N+3.45	B48	ENVOLVENTE MAI	0.738	0	-1.46	0	6.628	0	2.934
N+3.45	B48	ENVOLVENTE MAI	0.82	0	-1.13	0	6.628	0	3.294
N+3.45	B48	ENVOLVENTE MII	0	0	-53.07	0	-21.113	0	-43.631
N+3.45	B48	ENVOLVENTE MII	0.082	0	-52.62	0	-21.113	0	-39.298
N+3.45	B48	ENVOLVENTE MII	0.164	0	-52.1	0	-21.113	0	-35.005
N+3.45	B48	ENVOLVENTE MII	0.246	0	-51.52	0	-21.113	0	-30.757
N+3.45	B48	ENVOLVENTE MII	0.328	0	-50.89	0	-21.113	0	-26.559
N+3.45	B48	ENVOLVENTE MII	0.41	0	-50.18	0	-21.113	0	-22.416
N+3.45	B48	ENVOLVENTE MII	0.492	0	-49.48	0	-21.113	0	-18.331
N+3.45	B48	ENVOLVENTE MII	0.574	0	-48.85	0	-21.113	0	-14.303
N+3.45	B48	ENVOLVENTE MII	0.656	0	-48.27	0	-21.113	0	-10.325
N+3.45	B48	ENVOLVENTE MII	0.738	0	-47.75	0	-21.113	0	-6.395
N+3.45	B48	ENVOLVENTE MII	0.82	0	-47.3	0	-21.113	0	-2.752
N+3.45	B49	ENVOLVENTE MAI	0	0	1.18	0	0.304	0	0.288
N+3.45	B49	ENVOLVENTE MAI	0.083	0	1.31	0	0.304	0	0.217
N+3.45	B49	ENVOLVENTE MAI	0.166	0	1.47	0	0.304	0	0.256
N+3.45	B49	ENVOLVENTE MAI	0.249	0	1.64	0	0.304	0	0.55
N+3.45	B49	ENVOLVENTE MAI	0.332	0	1.83	0	0.304	0	0.882
N+3.45	B49	ENVOLVENTE MAI	0.415	0	2.05	0	0.304	0	1.18
N+3.45	B49	ENVOLVENTE MAI	0.498	0	2.27	0	0.304	0	1.44
N+3.45	B49	ENVOLVENTE MAI	0.581	0	2.46	0	0.304	0	1.666
N+3.45	B49	ENVOLVENTE MAI	0.664	0	2.64	0	0.304	0	1.864
N+3.45	B49	ENVOLVENTE MAI	0.747	0	2.79	0	0.304	0	2.037
N+3.45	B49	ENVOLVENTE MAI	0.83	0	2.97	0	0.304	0	2.192
N+3.45	B49	ENVOLVENTE MII	0	0	-5.21	0	-0.182	0	-0.852
N+3.45	B49	ENVOLVENTE MII	0.083	0	-5.02	0	-0.182	0	-0.459
N+3.45	B49	ENVOLVENTE MII	0.166	0	-4.77	0	-0.182	0	-0.207
N+3.45	B49	ENVOLVENTE MII	0.249	0	-4.45	0	-0.182	0	-0.247
N+3.45	B49	ENVOLVENTE MII	0.332	0	-4.07	0	-0.182	0	-0.368
N+3.45	B49	ENVOLVENTE MII	0.415	0	-3.62	0	-0.182	0	-0.508
N+3.45	B49	ENVOLVENTE MII	0.498	0	-3.18	0	-0.182	0	-0.665
N+3.45	B49	ENVOLVENTE MII	0.581	0	-2.8	0	-0.182	0	-0.84
N+3.45	B49	ENVOLVENTE MII	0.664	0	-2.48	0	-0.182	0	-1.03
N+3.45	B49	ENVOLVENTE MII	0.747	0	-2.23	0	-0.182	0	-1.234
N+3.45	B49	ENVOLVENTE MII	0.83	0	-2.09	0	-0.182	0	-1.45
N+3.45	B50	ENVOLVENTE MAI	0	0	2.11	0	0.181	0	2.201
N+3.45	B50	ENVOLVENTE MAI	0.082	0	2.28	0	0.181	0	2.042
N+3.45	B50	ENVOLVENTE MAI	0.164	0	2.53	0	0.181	0	1.865
N+3.45	B50	ENVOLVENTE MAI	0.246	0	2.84	0	0.181	0	1.665
N+3.45	B50	ENVOLVENTE MAI	0.328	0	3.21	0	0.181	0	1.437
N+3.45	B50	ENVOLVENTE MAI	0.41	0	3.65	0	0.181	0	1.176
N+3.45	B50	ENVOLVENTE MAI	0.492	0	4.08	0	0.181	0	0.879
N+3.45	B50	ENVOLVENTE MAI	0.574	0	4.46	0	0.181	0	0.549
N+3.45	B50	ENVOLVENTE MAI	0.656	0	4.77	0	0.181	0	0.257
N+3.45	B50	ENVOLVENTE MAI	0.738	0	5.02	0	0.181	0	0.216
N+3.45	B50	ENVOLVENTE MAI	0.82	0	5.21	0	0.181	0	0.286
N+3.45	B50	ENVOLVENTE MII	0	0	-2.91	0	-0.296	0	-1.429
N+3.45	B50	ENVOLVENTE MII	0.082	0	-2.76	0	-0.296	0	-1.217
N+3.45	B50	ENVOLVENTE MII	0.164	0	-2.61	0	-0.296	0	-1.017
N+3.45	B50	ENVOLVENTE MII	0.246	0	-2.44	0	-0.296	0	-0.83
N+3.45	B50	ENVOLVENTE MII	0.328	0	-2.24	0	-0.296	0	-0.658
N+3.45	B50	ENVOLVENTE MII	0.41	0	-2.03	0	-0.296	0	-0.502
N+3.45	B50	ENVOLVENTE MII	0.492	0	-1.82	0	-0.296	0	-0.365
N+3.45	B50	ENVOLVENTE MII	0.574	0	-1.63	0	-0.296	0	-0.244
N+3.45	B50	ENVOLVENTE MII	0.656	0	-1.46	0	-0.296	0	-0.205
N+3.45	B50	ENVOLVENTE MII	0.738	0	-1.31	0	-0.296	0	-0.452
N+3.45	B50	ENVOLVENTE MII	0.82	0	-1.18	0	-0.296	0	-0.84
N+3.45	B51	ENVOLVENTE MAI	0	0	4.17	0	2.495	0	0.413
N+3.45	B51	ENVOLVENTE MAI	0.178	0	5.39	0	2.495	0	0.212
N+3.45	B51	ENVOLVENTE MAI	0.356	0	7.17	0	2.495	0	0.422
N+3.45	B51	ENVOLVENTE MAI	0.534	0	9.4	0	2.495	0	0.45
N+3.45	B51	ENVOLVENTE MAI	0.712	0	11.66	0	2.495	0	0.274
N+3.45	B51	ENVOLVENTE MAI	0.89	0	13.92	0	2.495	0	-0.105
N+3.45	B51	ENVOLVENTE MAI	1.068	0	16.17	0	2.495	0	-0.687
N+3.45	B51	ENVOLVENTE MAI	1.246	0	18.43	0	2.495	0	-1.473
N+3.45	B51	ENVOLVENTE MAI	1.424	0	20.66	0	2.495	0	-2.461
N+3.45	B51	ENVOLVENTE MAI	1.602	0	22.45	0	2.495	0	-3.641
N+3.45	B51	ENVOLVENTE MAI	1.78	0	23.66	0	2.495	0	-4.978
N+3.45	B51	ENVOLVENTE MII	0	0	-2.49	0	-2.466	0	-0.176
N+3.45	B51	ENVOLVENTE MII	0.178	0	-1.7	0	-2.466	0	-0.441
N+3.45	B51	ENVOLVENTE MII	0.356	0	-0.72	0	-2.466	0	-1.542
N+3.45	B51	ENVOLVENTE MII	0.534	0	0.41	0	-2.466	0	-3.015

N+3.45	B51	ENVOLVENTE MII	0.712	0	1.56	0	-2.466	0	-4.889
N+3.45	B51	ENVOLVENTE MII	0.89	0	2.7	0	-2.466	0	-7.165
N+3.45	B51	ENVOLVENTE MII	1.068	0	3.84	0	-2.466	0	-9.843
N+3.45	B51	ENVOLVENTE MII	1.246	0	4.98	0	-2.466	0	-12.922
N+3.45	B51	ENVOLVENTE MII	1.424	0	6.12	0	-2.466	0	-16.403
N+3.45	B51	ENVOLVENTE MII	1.602	0	7.1	0	-2.466	0	-20.248
N+3.45	B51	ENVOLVENTE MII	1.78	0	7.89	0	-2.466	0	-24.36
N+3.45	B52	ENVOLVENTE MAI	0	0	5.21	0	0.288	0	0.182
N+3.45	B52	ENVOLVENTE MAI	0.178	0	5.7	0	0.288	0	0.282
N+3.45	B52	ENVOLVENTE MAI	0.356	0	6.48	0	0.288	0	0.403
N+3.45	B52	ENVOLVENTE MAI	0.534	0	7.48	0	0.288	0	0.443
N+3.45	B52	ENVOLVENTE MAI	0.712	0	8.5	0	0.288	0	0.398
N+3.45	B52	ENVOLVENTE MAI	0.89	0	9.52	0	0.288	0	0.265
N+3.45	B52	ENVOLVENTE MAI	1.068	0	10.54	0	0.288	0	0.047
N+3.45	B52	ENVOLVENTE MAI	1.246	0	11.55	0	0.288	0	-0.258
N+3.45	B52	ENVOLVENTE MAI	1.424	0	12.56	0	0.288	0	-0.65
N+3.45	B52	ENVOLVENTE MAI	1.602	0	13.33	0	0.288	0	-1.122
N+3.45	B52	ENVOLVENTE MAI	1.78	0	13.82	0	0.288	0	-1.657
N+3.45	B52	ENVOLVENTE MII	0	0	-1.18	0	-0.852	0	-0.304
N+3.45	B52	ENVOLVENTE MII	0.178	0	-0.87	0	-0.852	0	-1.188
N+3.45	B52	ENVOLVENTE MII	0.356	0	-0.47	0	-0.852	0	-2.268
N+3.45	B52	ENVOLVENTE MII	0.534	0	0.01	0	-0.852	0	-3.509
N+3.45	B52	ENVOLVENTE MII	0.712	0	0.5	0	-0.852	0	-4.932
N+3.45	B52	ENVOLVENTE MII	0.89	0	0.99	0	-0.852	0	-6.536
N+3.45	B52	ENVOLVENTE MII	1.068	0	1.47	0	-0.852	0	-8.321
N+3.45	B52	ENVOLVENTE MII	1.246	0	1.96	0	-0.852	0	-10.287
N+3.45	B52	ENVOLVENTE MII	1.424	0	2.44	0	-0.852	0	-12.433
N+3.45	B52	ENVOLVENTE MII	1.602	0	2.84	0	-0.852	0	-14.742
N+3.45	B52	ENVOLVENTE MII	1.78	0	3.15	0	-0.852	0	-17.163
N+3.45	B53	ENVOLVENTE MAI	0	0	5.21	0	0.84	0	0.181
N+3.45	B53	ENVOLVENTE MAI	0.178	0	5.7	0	0.84	0	0.279
N+3.45	B53	ENVOLVENTE MAI	0.356	0	6.48	0	0.84	0	0.398
N+3.45	B53	ENVOLVENTE MAI	0.534	0	7.47	0	0.84	0	0.438
N+3.45	B53	ENVOLVENTE MAI	0.712	0	8.48	0	0.84	0	0.392
N+3.45	B53	ENVOLVENTE MAI	0.89	0	9.49	0	0.84	0	0.26
N+3.45	B53	ENVOLVENTE MAI	1.068	0	10.5	0	0.84	0	0.042
N+3.45	B53	ENVOLVENTE MAI	1.246	0	11.51	0	0.84	0	-0.262
N+3.45	B53	ENVOLVENTE MAI	1.424	0	12.51	0	0.84	0	-0.652
N+3.45	B53	ENVOLVENTE MAI	1.602	0	13.29	0	0.84	0	-1.122
N+3.45	B53	ENVOLVENTE MAI	1.78	0	13.78	0	0.84	0	-1.656
N+3.45	B53	ENVOLVENTE MII	0	0	-1.18	0	-0.286	0	-0.296
N+3.45	B53	ENVOLVENTE MII	0.178	0	-0.87	0	-0.286	0	-1.177
N+3.45	B53	ENVOLVENTE MII	0.356	0	-0.46	0	-0.286	0	-2.256
N+3.45	B53	ENVOLVENTE MII	0.534	0	0.02	0	-0.286	0	-3.497
N+3.45	B53	ENVOLVENTE MII	0.712	0	0.5	0	-0.286	0	-4.917
N+3.45	B53	ENVOLVENTE MII	0.89	0	0.98	0	-0.286	0	-6.517
N+3.45	B53	ENVOLVENTE MII	1.068	0	1.47	0	-0.286	0	-8.296
N+3.45	B53	ENVOLVENTE MII	1.246	0	1.95	0	-0.286	0	-10.255
N+3.45	B53	ENVOLVENTE MII	1.424	0	2.43	0	-0.286	0	-12.394
N+3.45	B53	ENVOLVENTE MII	1.602	0	2.83	0	-0.286	0	-14.694
N+3.45	B53	ENVOLVENTE MII	1.78	0	3.14	0	-0.286	0	-17.106
N+1.02	B56	ENVOLVENTE MAI	0	20.48	-20.18	33.81	3.95	25.059	-15.437
N+1.02	B56	ENVOLVENTE MAI	0.083	20.48	-19.85	33.81	3.95	22.254	-13.771
N+1.02	B56	ENVOLVENTE MAI	0.166	20.48	-19.53	33.81	3.95	19.45	-12.13
N+1.02	B56	ENVOLVENTE MAI	0.249	20.48	-19.21	33.81	3.95	16.646	-10.513
N+1.02	B56	ENVOLVENTE MAI	0.332	20.48	-18.89	33.81	3.95	13.843	-8.919
N+1.02	B56	ENVOLVENTE MAI	0.415	20.48	-18.56	33.81	3.95	11.041	-7.346
N+1.02	B56	ENVOLVENTE MAI	0.498	20.48	-18.24	33.81	3.95	8.243	-5.789
N+1.02	B56	ENVOLVENTE MAI	0.581	20.48	-17.92	33.81	3.95	5.452	-4.242
N+1.02	B56	ENVOLVENTE MAI	0.664	20.48	-17.59	33.81	3.95	2.692	-2.695
N+1.02	B56	ENVOLVENTE MAI	0.747	20.48	-17.27	33.81	3.95	0.71	-1.027
N+1.02	B56	ENVOLVENTE MAI	0.83	20.48	-16.95	33.81	3.95	3.293	0.823
N+1.02	B56	ENVOLVENTE MII	0	-20.5	-53.46	-37.61	-0.858	-28.016	-42.221
N+1.02	B56	ENVOLVENTE MII	0.083	-20.5	-53.03	-37.61	-0.858	-24.896	-37.802
N+1.02	B56	ENVOLVENTE MII	0.166	-20.5	-52.6	-37.61	-0.858	-21.776	-33.418
N+1.02	B56	ENVOLVENTE MII	0.249	-20.5	-52.17	-37.61	-0.858	-18.657	-29.07
N+1.02	B56	ENVOLVENTE MII	0.332	-20.5	-51.74	-37.61	-0.858	-15.539	-24.758
N+1.02	B56	ENVOLVENTE MII	0.415	-20.5	-51.31	-37.61	-0.858	-12.422	-20.481
N+1.02	B56	ENVOLVENTE MII	0.498	-20.5	-50.88	-37.61	-0.858	-9.309	-16.24
N+1.02	B56	ENVOLVENTE MII	0.581	-20.5	-50.45	-37.61	-0.858	-6.203	-12.035
N+1.02	B56	ENVOLVENTE MII	0.664	-20.5	-50.02	-37.61	-0.858	-3.127	-7.865
N+1.02	B56	ENVOLVENTE MII	0.747	-20.5	-49.59	-37.61	-0.858	-0.83	-3.732
N+1.02	B56	ENVOLVENTE MII	0.83	-20.5	-49.16	-37.61	-0.858	-3.098	-0.364
N+1.02	B57	ENVOLVENTE MAI	0	20.28	-20.2	41.27	0.896	30.528	-15.297
N+1.02	B57	ENVOLVENTE MAI	0.082	20.28	-19.88	41.27	0.896	27.146	-13.648
N+1.02	B57	ENVOLVENTE MAI	0.164	20.28	-19.57	41.27	0.896	23.763	-12.024

N+1.02	B57	ENVOLVENTE MAI	0.246	20.28	-19.25	41.27	0.896	20.381	-10.424
N+1.02	B57	ENVOLVENTE MAI	0.328	20.28	-18.93	41.27	0.896	17	-8.847
N+1.02	B57	ENVOLVENTE MAI	0.41	20.28	-18.61	41.27	0.896	13.62	-7.289
N+1.02	B57	ENVOLVENTE MAI	0.492	20.28	-18.29	41.27	0.896	10.242	-5.748
N+1.02	B57	ENVOLVENTE MAI	0.574	20.28	-17.97	41.27	0.896	6.871	-4.216
N+1.02	B57	ENVOLVENTE MAI	0.656	20.28	-17.65	41.27	0.896	3.524	-2.681
N+1.02	B57	ENVOLVENTE MAI	0.738	20.28	-17.33	41.27	0.896	0.857	-1.025
N+1.02	B57	ENVOLVENTE MAI	0.82	20.28	-17.02	41.27	0.896	3.14	0.798
N+1.02	B57	ENVOLVENTE MII	0	-20.31	-53.52	-36.46	-4.077	-26.843	-41.803
N+1.02	B57	ENVOLVENTE MII	0.082	-20.31	-53.09	-36.46	-4.077	-23.855	-37.432
N+1.02	B57	ENVOLVENTE MII	0.164	-20.31	-52.67	-36.46	-4.077	-20.867	-33.096
N+1.02	B57	ENVOLVENTE MII	0.246	-20.31	-52.24	-36.46	-4.077	-17.88	-28.795
N+1.02	B57	ENVOLVENTE MII	0.328	-20.31	-51.82	-36.46	-4.077	-14.893	-24.529
N+1.02	B57	ENVOLVENTE MII	0.41	-20.31	-51.39	-36.46	-4.077	-11.907	-20.297
N+1.02	B57	ENVOLVENTE MII	0.492	-20.31	-50.96	-36.46	-4.077	-8.924	-16.101
N+1.02	B57	ENVOLVENTE MII	0.574	-20.31	-50.54	-36.46	-4.077	-5.948	-11.939
N+1.02	B57	ENVOLVENTE MII	0.656	-20.31	-50.11	-36.46	-4.077	-2.995	-7.812
N+1.02	B57	ENVOLVENTE MII	0.738	-20.31	-49.69	-36.46	-4.077	-0.723	-3.72
N+1.02	B57	ENVOLVENTE MII	0.82	-20.31	-49.26	-36.46	-4.077	-3.4	-0.376
N+1.83	B58	ENVOLVENTE MAI	0	33.62	-22.24	30.23	1.169	21.647	-16.732
N+1.83	B58	ENVOLVENTE MAI	0.082	33.62	-21.92	30.23	1.169	19.171	-14.909
N+1.83	B58	ENVOLVENTE MAI	0.164	33.62	-21.61	30.23	1.169	16.697	-13.11
N+1.83	B58	ENVOLVENTE MAI	0.246	33.62	-21.29	30.23	1.169	14.231	-11.332
N+1.83	B58	ENVOLVENTE MAI	0.328	33.62	-20.97	30.23	1.169	11.767	-9.576
N+1.83	B58	ENVOLVENTE MAI	0.41	33.62	-20.65	30.23	1.169	9.305	-7.839
N+1.83	B58	ENVOLVENTE MAI	0.492	33.62	-20.33	30.23	1.169	6.85	-6.117
N+1.83	B58	ENVOLVENTE MAI	0.574	33.62	-20.01	30.23	1.169	4.414	-4.402
N+1.83	B58	ENVOLVENTE MAI	0.656	33.62	-19.69	30.23	1.169	2.099	-2.665
N+1.83	B58	ENVOLVENTE MAI	0.738	33.62	-19.37	30.23	1.169	1.351	-0.904
N+1.83	B58	ENVOLVENTE MAI	0.82	33.62	-19.06	30.23	1.169	3.133	0.982
N+1.83	B58	ENVOLVENTE MII	0	-33.45	-62.19	-30.32	-11.416	-21.9	-49.076
N+1.83	B58	ENVOLVENTE MII	0.082	-33.45	-61.76	-30.32	-11.416	-19.416	-43.995
N+1.83	B58	ENVOLVENTE MII	0.164	-33.45	-61.34	-30.32	-11.416	-16.934	-38.948
N+1.83	B58	ENVOLVENTE MII	0.246	-33.45	-60.91	-30.32	-11.416	-14.46	-33.935
N+1.83	B58	ENVOLVENTE MII	0.328	-33.45	-60.49	-30.32	-11.416	-11.988	-28.958
N+1.83	B58	ENVOLVENTE MII	0.41	-33.45	-60.06	-30.32	-11.416	-9.519	-24.016
N+1.83	B58	ENVOLVENTE MII	0.492	-33.45	-59.64	-30.32	-11.416	-7.057	-19.108
N+1.83	B58	ENVOLVENTE MII	0.574	-33.45	-59.21	-30.32	-11.416	-4.613	-14.235
N+1.83	B58	ENVOLVENTE MII	0.656	-33.45	-58.79	-30.32	-11.416	-2.291	-9.398
N+1.83	B58	ENVOLVENTE MII	0.738	-33.45	-58.36	-30.32	-11.416	-1.535	-4.679
N+1.83	B58	ENVOLVENTE MII	0.82	-33.45	-57.94	-30.32	-11.416	-3.309	-0.76
N+1.83	B59	ENVOLVENTE MAI	0	33.8	-22.93	24.07	10.363	17.344	-17.031
N+1.83	B59	ENVOLVENTE MAI	0.083	33.8	-22.61	24.07	10.363	15.35	-15.127
N+1.83	B59	ENVOLVENTE MAI	0.166	33.8	-22.29	24.07	10.363	13.357	-13.246
N+1.83	B59	ENVOLVENTE MAI	0.249	33.8	-21.96	24.07	10.363	11.366	-11.389
N+1.83	B59	ENVOLVENTE MAI	0.332	33.8	-21.64	24.07	10.363	9.377	-9.554
N+1.83	B59	ENVOLVENTE MAI	0.415	33.8	-21.32	24.07	10.363	7.394	-7.741
N+1.83	B59	ENVOLVENTE MAI	0.498	33.8	-20.99	24.07	10.363	5.421	-5.946
N+1.83	B59	ENVOLVENTE MAI	0.581	33.8	-20.67	24.07	10.363	3.488	-4.168
N+1.83	B59	ENVOLVENTE MAI	0.664	33.8	-20.35	24.07	10.363	1.744	-2.392
N+1.83	B59	ENVOLVENTE MAI	0.747	33.8	-20.03	24.07	10.363	1.589	-0.595
N+1.83	B59	ENVOLVENTE MAI	0.83	33.8	-19.7	24.07	10.363	3.265	1.622
N+1.83	B59	ENVOLVENTE MII	0	-33.67	-61.28	-24.69	-2.427	-17.604	-48.232
N+1.83	B59	ENVOLVENTE MII	0.083	-33.67	-60.85	-24.69	-2.427	-15.559	-43.163
N+1.83	B59	ENVOLVENTE MII	0.166	-33.67	-60.42	-24.69	-2.427	-13.514	-38.13
N+1.83	B59	ENVOLVENTE MII	0.249	-33.67	-59.99	-24.69	-2.427	-11.472	-33.133
N+1.83	B59	ENVOLVENTE MII	0.332	-33.67	-59.56	-24.69	-2.427	-9.431	-28.172
N+1.83	B59	ENVOLVENTE MII	0.415	-33.67	-59.13	-24.69	-2.427	-7.396	-23.247
N+1.83	B59	ENVOLVENTE MII	0.498	-33.67	-58.7	-24.69	-2.427	-5.372	-18.357
N+1.83	B59	ENVOLVENTE MII	0.581	-33.67	-58.27	-24.69	-2.427	-3.387	-13.502
N+1.83	B59	ENVOLVENTE MII	0.664	-33.67	-57.84	-24.69	-2.427	-1.592	-8.684
N+1.83	B59	ENVOLVENTE MII	0.747	-33.67	-57.41	-24.69	-2.427	-1.385	-4.144
N+1.83	B59	ENVOLVENTE MII	0.83	-33.67	-56.98	-24.69	-2.427	-3.009	-0.579
N+2.64	B60	ENVOLVENTE MAI	0	28.89	50.57	69.5	28.478	7.723	1.052
N+2.64	B60	ENVOLVENTE MAI	0.083	28.89	51	69.5	28.478	2.541	-0.219
N+2.64	B60	ENVOLVENTE MAI	0.166	28.89	51.43	69.5	28.478	4.806	-1.419
N+2.64	B60	ENVOLVENTE MAI	0.249	28.89	51.86	69.5	28.478	10.82	-2.602
N+2.64	B60	ENVOLVENTE MAI	0.332	28.89	52.29	69.5	28.478	16.892	-3.792
N+2.64	B60	ENVOLVENTE MAI	0.415	28.89	52.72	69.5	28.478	22.975	-4.998
N+2.64	B60	ENVOLVENTE MAI	0.498	28.89	53.15	69.5	28.478	29.061	-6.225
N+2.64	B60	ENVOLVENTE MAI	0.581	28.89	53.58	69.5	28.478	35.15	-7.475
N+2.64	B60	ENVOLVENTE MAI	0.664	28.89	54.01	69.5	28.478	41.239	-8.749
N+2.64	B60	ENVOLVENTE MAI	0.747	28.89	54.44	69.5	28.478	47.329	-10.048
N+2.64	B60	ENVOLVENTE MAI	0.83	28.89	54.87	69.5	28.478	53.419	-11.372
N+2.64	B60	ENVOLVENTE MII	0	-28.93	12.81	-73.39	-16.918	-7.614	-1.233
N+2.64	B60	ENVOLVENTE MII	0.083	-28.93	13.14	-73.39	-16.918	-2.108	-5.086

N+2.64	B60	ENVOLVENTE MII	0.166	-28.93	13.46	-73.39	-16.918	-4.05	-9.073
N+2.64	B60	ENVOLVENTE MII	0.249	-28.93	13.78	-73.39	-16.918	-9.74	-13.139
N+2.64	B60	ENVOLVENTE MII	0.332	-28.93	14.1	-73.39	-16.918	-15.489	-17.26
N+2.64	B60	ENVOLVENTE MII	0.415	-28.93	14.43	-73.39	-16.918	-21.248	-21.595
N+2.64	B60	ENVOLVENTE MII	0.498	-28.93	14.75	-73.39	-16.918	-27.011	-25.989
N+2.64	B60	ENVOLVENTE MII	0.581	-28.93	15.07	-73.39	-16.918	-32.776	-30.418
N+2.64	B60	ENVOLVENTE MII	0.664	-28.93	15.39	-73.39	-16.918	-38.542	-34.883
N+2.64	B60	ENVOLVENTE MII	0.747	-28.93	15.72	-73.39	-16.918	-44.308	-39.384
N+2.64	B60	ENVOLVENTE MII	0.83	-28.93	16.04	-73.39	-16.918	-50.075	-43.921
N+2.64	B61	ENVOLVENTE MA:	0	28.78	-14.92	72.01	17.53	51.705	-10.263
N+2.64	B61	ENVOLVENTE MA:	0.082	28.78	-14.6	72.01	17.53	45.802	-9.02
N+2.64	B61	ENVOLVENTE MA:	0.164	28.78	-14.28	72.01	17.53	39.899	-7.801
N+2.64	B61	ENVOLVENTE MA:	0.246	28.78	-13.97	72.01	17.53	33.997	-6.607
N+2.64	B61	ENVOLVENTE MA:	0.328	28.78	-13.65	72.01	17.53	28.096	-5.436
N+2.64	B61	ENVOLVENTE MA:	0.41	28.78	-13.33	72.01	17.53	22.197	-4.288
N+2.64	B61	ENVOLVENTE MA:	0.492	28.78	-13.01	72.01	17.53	16.302	-3.161
N+2.64	B61	ENVOLVENTE MA:	0.574	28.78	-12.69	72.01	17.53	10.419	-2.05
N+2.64	B61	ENVOLVENTE MA:	0.656	28.78	-12.37	72.01	17.53	4.597	-0.949
N+2.64	B61	ENVOLVENTE MA:	0.738	28.78	-12.05	72.01	17.53	2.481	0.166
N+2.64	B61	ENVOLVENTE MA:	0.82	28.78	-11.73	72.01	17.53	7.416	1.621
N+2.64	B61	ENVOLVENTE MII	0	-28.71	-53.34	-67.28	-26.139	-47.899	-41.373
N+2.64	B61	ENVOLVENTE MII	0.082	-28.71	-52.91	-67.28	-26.139	-42.383	-37.016
N+2.64	B61	ENVOLVENTE MII	0.164	-28.71	-52.49	-67.28	-26.139	-36.868	-32.695
N+2.64	B61	ENVOLVENTE MII	0.246	-28.71	-52.06	-67.28	-26.139	-31.354	-28.409
N+2.64	B61	ENVOLVENTE MII	0.328	-28.71	-51.64	-67.28	-26.139	-25.841	-24.207
N+2.64	B61	ENVOLVENTE MII	0.41	-28.71	-51.21	-67.28	-26.139	-20.33	-20.134
N+2.64	B61	ENVOLVENTE MII	0.492	-28.71	-50.79	-67.28	-26.139	-14.823	-16.101
N+2.64	B61	ENVOLVENTE MII	0.574	-28.71	-50.36	-67.28	-26.139	-9.328	-12.112
N+2.64	B61	ENVOLVENTE MII	0.656	-28.71	-49.94	-67.28	-26.139	-3.894	-8.176
N+2.64	B61	ENVOLVENTE MII	0.738	-28.71	-49.51	-67.28	-26.139	-2.166	-4.314
N+2.64	B61	ENVOLVENTE MII	0.82	-28.71	-49.09	-67.28	-26.139	-7.489	-0.852
N+3.45	B62	ENVOLVENTE MA:	0	35.62	50.67	52.16	15.649	6.497	4.065
N+3.45	B62	ENVOLVENTE MA:	0.083	35.62	51.1	52.16	15.649	2.438	2.507
N+3.45	B62	ENVOLVENTE MA:	0.166	35.62	51.54	52.16	15.649	2.795	1.131
N+3.45	B62	ENVOLVENTE MA:	0.249	35.62	51.97	52.16	15.649	7.117	-0.265
N+3.45	B62	ENVOLVENTE MA:	0.332	35.62	52.4	52.16	15.649	11.519	-1.685
N+3.45	B62	ENVOLVENTE MA:	0.415	35.62	52.83	52.16	15.649	15.933	-3.128
N+3.45	B62	ENVOLVENTE MA:	0.498	35.62	53.26	52.16	15.649	20.352	-4.574
N+3.45	B62	ENVOLVENTE MA:	0.581	35.62	53.69	52.16	15.649	24.772	-6.032
N+3.45	B62	ENVOLVENTE MA:	0.664	35.62	54.12	52.16	15.649	29.194	-7.511
N+3.45	B62	ENVOLVENTE MA:	0.747	35.62	54.55	52.16	15.649	33.616	-9.015
N+3.45	B62	ENVOLVENTE MA:	0.83	35.62	54.98	52.16	15.649	38.039	-10.545
N+3.45	B62	ENVOLVENTE MII	0	-35.49	15.27	-53.3	-23.688	-6.343	-3.48
N+3.45	B62	ENVOLVENTE MII	0.083	-35.49	15.59	-53.3	-23.688	-2.189	-7.053
N+3.45	B62	ENVOLVENTE MII	0.166	-35.49	15.91	-53.3	-23.688	-2.451	-10.871
N+3.45	B62	ENVOLVENTE MII	0.249	-35.49	16.23	-53.3	-23.688	-6.678	-14.731
N+3.45	B62	ENVOLVENTE MII	0.332	-35.49	16.56	-53.3	-23.688	-10.986	-18.63
N+3.45	B62	ENVOLVENTE MII	0.415	-35.49	16.88	-53.3	-23.688	-15.305	-22.568
N+3.45	B62	ENVOLVENTE MII	0.498	-35.49	17.2	-53.3	-23.688	-19.629	-26.565
N+3.45	B62	ENVOLVENTE MII	0.581	-35.49	17.53	-53.3	-23.688	-23.954	-30.613
N+3.45	B62	ENVOLVENTE MII	0.664	-35.49	17.85	-53.3	-23.688	-28.281	-34.703
N+3.45	B62	ENVOLVENTE MII	0.747	-35.49	18.17	-53.3	-23.688	-32.608	-38.83
N+3.45	B62	ENVOLVENTE MII	0.83	-35.49	18.49	-53.3	-23.688	-36.936	-43.369
N+3.45	B63	ENVOLVENTE MA:	0	35.31	-18.43	53.7	23.674	37.823	-10.331
N+3.45	B63	ENVOLVENTE MA:	0.082	35.31	-18.12	53.7	23.674	33.421	-8.824
N+3.45	B63	ENVOLVENTE MA:	0.164	35.31	-17.8	53.7	23.674	29.02	-7.343
N+3.45	B63	ENVOLVENTE MA:	0.246	35.31	-17.48	53.7	23.674	24.619	-5.886
N+3.45	B63	ENVOLVENTE MA:	0.328	35.31	-17.16	53.7	23.674	20.219	-4.45
N+3.45	B63	ENVOLVENTE MA:	0.41	35.31	-16.84	53.7	23.674	15.822	-3.025
N+3.45	B63	ENVOLVENTE MA:	0.492	35.31	-16.52	53.7	23.674	11.429	-1.602
N+3.45	B63	ENVOLVENTE MA:	0.574	35.31	-16.2	53.7	23.674	7.05	-0.203
N+3.45	B63	ENVOLVENTE MA:	0.656	35.31	-15.88	53.7	23.674	2.751	1.173
N+3.45	B63	ENVOLVENTE MA:	0.738	35.31	-15.56	53.7	23.674	2.391	2.527
N+3.45	B63	ENVOLVENTE MA:	0.82	35.31	-15.25	53.7	23.674	6.353	4.071
N+3.45	B63	ENVOLVENTE MII	0	-35.29	-54.76	-51.67	-15.306	-36.129	-42.67
N+3.45	B63	ENVOLVENTE MII	0.082	-35.29	-54.33	-51.67	-15.306	-31.893	-38.246
N+3.45	B63	ENVOLVENTE MII	0.164	-35.29	-53.91	-51.67	-15.306	-27.659	-34.186
N+3.45	B63	ENVOLVENTE MII	0.246	-35.29	-53.48	-51.67	-15.306	-23.425	-30.163
N+3.45	B63	ENVOLVENTE MII	0.328	-35.29	-53.06	-51.67	-15.306	-19.192	-26.18
N+3.45	B63	ENVOLVENTE MII	0.41	-35.29	-52.63	-51.67	-15.306	-14.962	-22.248
N+3.45	B63	ENVOLVENTE MII	0.492	-35.29	-52.21	-51.67	-15.306	-10.736	-18.374
N+3.45	B63	ENVOLVENTE MII	0.574	-35.29	-51.78	-51.67	-15.306	-6.523	-14.537
N+3.45	B63	ENVOLVENTE MII	0.656	-35.29	-51.36	-51.67	-15.306	-2.391	-10.739
N+3.45	B63	ENVOLVENTE MII	0.738	-35.29	-50.93	-51.67	-15.306	-2.198	-6.98
N+3.45	B63	ENVOLVENTE MII	0.82	-35.29	-50.51	-51.67	-15.306	-6.327	-3.47

FUERZAS EN COLUMNAS

COLUMN FORCES

UNID: kN-m

Story	Column	Load	Loc	P	V2	V3	T	M2	M3
N+0.21	C1	ENVOLVENTE MAJ	0	-77.7	179.68	76.21	80.178	18.044	23.435
N+0.21	C1	ENVOLVENTE MAJ	0.026	-77.56	179.68	76.21	80.178	16.123	19.142
N+0.21	C1	ENVOLVENTE MAJ	0.052	-77.42	179.68	76.21	80.178	14.21	14.951
N+0.21	C1	ENVOLVENTE MAJ	0.078	-77.28	179.68	76.21	80.178	12.31	10.922
N+0.21	C1	ENVOLVENTE MAJ	0.104	-77.14	179.68	76.21	80.178	10.431	7.168
N+0.21	C1	ENVOLVENTE MAJ	0.13	-77	179.68	76.21	80.178	8.586	3.906
N+0.21	C1	ENVOLVENTE MAJ	0.156	-76.86	179.68	76.21	80.178	6.806	1.584
N+0.21	C1	ENVOLVENTE MAJ	0.182	-76.72	179.68	76.21	80.178	5.172	1.183
N+0.21	C1	ENVOLVENTE MAJ	0.208	-76.58	179.68	76.21	80.178	4.045	2.425
N+0.21	C1	ENVOLVENTE MAJ	0.234	-76.43	179.68	76.21	80.178	3.888	4.929
N+0.21	C1	ENVOLVENTE MAJ	0.26	-76.29	179.68	76.21	80.178	5.131	8.183
N+0.21	C1	ENVOLVENTE MII	0	-212.97	-169.02	-76.13	-80.846	-17.325	-51.799
N+0.21	C1	ENVOLVENTE MII	0.026	-212.79	-169.02	-76.13	-80.846	-15.405	-47.783
N+0.21	C1	ENVOLVENTE MII	0.052	-212.6	-169.02	-76.13	-80.846	-13.495	-43.869
N+0.21	C1	ENVOLVENTE MII	0.078	-212.41	-169.02	-76.13	-80.846	-11.597	-40.117
N+0.21	C1	ENVOLVENTE MII	0.104	-212.23	-169.02	-76.13	-80.846	-9.72	-36.641
N+0.21	C1	ENVOLVENTE MII	0.13	-212.04	-169.02	-76.13	-80.846	-7.877	-33.656
N+0.21	C1	ENVOLVENTE MII	0.156	-211.85	-169.02	-76.13	-80.846	-6.099	-31.612
N+0.21	C1	ENVOLVENTE MII	0.182	-211.66	-169.02	-76.13	-80.846	-4.467	-31.488
N+0.21	C1	ENVOLVENTE MII	0.208	-211.48	-169.02	-76.13	-80.846	-3.342	-33.007
N+0.21	C1	ENVOLVENTE MII	0.234	-211.29	-169.02	-76.13	-80.846	-3.187	-35.789
N+0.21	C1	ENVOLVENTE MII	0.26	-211.1	-169.02	-76.13	-80.846	-4.432	-39.319
N+0.21	C2	ENVOLVENTE MAJ	0	-94.56	82.6	62.94	10.626	37.89	48.768
N+0.21	C2	ENVOLVENTE MAJ	0.026	-94.42	82.6	62.94	10.626	36.396	46.805
N+0.21	C2	ENVOLVENTE MAJ	0.052	-94.28	82.6	62.94	10.626	34.915	44.862
N+0.21	C2	ENVOLVENTE MAJ	0.078	-94.14	82.6	62.94	10.626	33.448	42.94
N+0.21	C2	ENVOLVENTE MAJ	0.104	-94	82.6	62.94	10.626	31.999	41.043
N+0.21	C2	ENVOLVENTE MAJ	0.13	-93.86	82.6	62.94	10.626	30.57	39.177
N+0.21	C2	ENVOLVENTE MAJ	0.156	-93.72	82.6	62.94	10.626	29.163	37.345
N+0.21	C2	ENVOLVENTE MAJ	0.182	-93.58	82.6	62.94	10.626	27.782	35.555
N+0.21	C2	ENVOLVENTE MAJ	0.208	-93.44	82.6	62.94	10.626	26.432	33.815
N+0.21	C2	ENVOLVENTE MAJ	0.234	-93.3	82.6	62.94	10.626	25.117	32.134
N+0.21	C2	ENVOLVENTE MAJ	0.26	-93.16	82.6	62.94	10.626	23.844	30.525
N+0.21	C2	ENVOLVENTE MII	0	-232.35	-158.43	-62.87	-10.962	-37.469	-78.256
N+0.21	C2	ENVOLVENTE MII	0.026	-232.16	-158.43	-62.87	-10.962	-35.976	-74.321
N+0.21	C2	ENVOLVENTE MII	0.052	-231.98	-158.43	-62.87	-10.962	-34.497	-70.405
N+0.21	C2	ENVOLVENTE MII	0.078	-231.79	-158.43	-62.87	-10.962	-33.033	-66.512
N+0.21	C2	ENVOLVENTE MII	0.104	-231.6	-158.43	-62.87	-10.962	-31.585	-62.644
N+0.21	C2	ENVOLVENTE MII	0.13	-231.42	-158.43	-62.87	-10.962	-30.158	-58.805
N+0.21	C2	ENVOLVENTE MII	0.156	-231.23	-158.43	-62.87	-10.962	-28.753	-55.002
N+0.21	C2	ENVOLVENTE MII	0.182	-231.04	-158.43	-62.87	-10.962	-27.374	-51.24
N+0.21	C2	ENVOLVENTE MII	0.208	-230.85	-158.43	-62.87	-10.962	-26.026	-47.528
N+0.21	C2	ENVOLVENTE MII	0.234	-230.67	-158.43	-62.87	-10.962	-24.713	-43.876
N+0.21	C2	ENVOLVENTE MII	0.26	-230.48	-158.43	-62.87	-10.962	-23.442	-40.295
N+1.02	C3	ENVOLVENTE MAJ	0	-109.07	77.91	140.04	19.738	111.273	48.806
N+1.02	C3	ENVOLVENTE MAJ	0.081	-108.63	77.91	140.04	19.738	99.953	42.509
N+1.02	C3	ENVOLVENTE MAJ	0.162	-108.19	77.91	140.04	19.738	88.639	37.444
N+1.02	C3	ENVOLVENTE MAJ	0.243	-107.76	77.91	140.04	19.738	77.333	32.46
N+1.02	C3	ENVOLVENTE MAJ	0.324	-107.32	77.91	140.04	19.738	66.038	27.497
N+1.02	C3	ENVOLVENTE MAJ	0.405	-106.88	77.91	140.04	19.738	54.761	22.589
N+1.02	C3	ENVOLVENTE MAJ	0.486	-106.44	77.91	140.04	19.738	43.513	17.915
N+1.02	C3	ENVOLVENTE MAJ	0.567	-106.01	77.91	140.04	19.738	32.323	17.074
N+1.02	C3	ENVOLVENTE MAJ	0.648	-105.57	77.91	140.04	19.738	21.392	25.113
N+1.02	C3	ENVOLVENTE MAJ	0.729	-105.13	77.91	140.04	19.738	13.506	34.571
N+1.02	C3	ENVOLVENTE MAJ	0.81	-104.69	77.91	140.04	19.738	8.419	44.156
N+1.02	C3	ENVOLVENTE MII	0	-270.12	-119.29	-140.67	-20.27	-116.98	-52.723
N+1.02	C3	ENVOLVENTE MII	0.081	-269.54	-119.29	-140.67	-20.27	-105.609	-43.074
N+1.02	C3	ENVOLVENTE MII	0.162	-268.96	-119.29	-140.67	-20.27	-94.243	-34.657
N+1.02	C3	ENVOLVENTE MII	0.243	-268.37	-119.29	-140.67	-20.27	-82.885	-26.322
N+1.02	C3	ENVOLVENTE MII	0.324	-267.79	-119.29	-140.67	-20.27	-71.539	-18.008
N+1.02	C3	ENVOLVENTE MII	0.405	-267.21	-119.29	-140.67	-20.27	-60.21	-9.749
N+1.02	C3	ENVOLVENTE MII	0.486	-266.63	-119.29	-140.67	-20.27	-48.912	-1.723
N+1.02	C3	ENVOLVENTE MII	0.567	-266.04	-119.29	-140.67	-20.27	-37.669	2.75
N+1.02	C3	ENVOLVENTE MII	0.648	-265.46	-119.29	-140.67	-20.27	-26.687	-2.218
N+1.02	C3	ENVOLVENTE MII	0.729	-264.88	-119.29	-140.67	-20.27	-18.749	-8.325
N+1.02	C3	ENVOLVENTE MII	0.81	-264.29	-119.29	-140.67	-20.27	-13.611	-14.558
N+0.21	C3	ENVOLVENTE MAJ	0	-110.47	78.41	140.61	19.738	147.775	69.131
N+0.21	C3	ENVOLVENTE MAJ	0.026	-110.33	78.41	140.61	19.738	144.124	67.097
N+0.21	C3	ENVOLVENTE MAJ	0.052	-110.19	78.41	140.61	19.738	140.473	65.063

N+0.21	C3	ENVOLVENTE MAI	0.078	-110.05	78.41	140.61	19.738	136.822	63.029
N+0.21	C3	ENVOLVENTE MAI	0.104	-109.91	78.41	140.61	19.738	133.171	60.996
N+0.21	C3	ENVOLVENTE MAI	0.13	-109.77	78.41	140.61	19.738	129.52	58.963
N+0.21	C3	ENVOLVENTE MAI	0.156	-109.63	78.41	140.61	19.738	125.87	56.93
N+0.21	C3	ENVOLVENTE MAI	0.182	-109.49	78.41	140.61	19.738	122.22	54.898
N+0.21	C3	ENVOLVENTE MAI	0.208	-109.35	78.41	140.61	19.738	118.571	52.867
N+0.21	C3	ENVOLVENTE MAI	0.234	-109.21	78.41	140.61	19.738	114.922	50.836
N+0.21	C3	ENVOLVENTE MAI	0.26	-109.07	78.41	140.61	19.738	111.273	48.806
N+0.21	C3	ENVOLVENTE MII	0	-272	-119.78	-141.25	-20.27	-153.648	-83.806
N+0.21	C3	ENVOLVENTE MII	0.026	-271.81	-119.78	-141.25	-20.27	-149.98	-80.696
N+0.21	C3	ENVOLVENTE MII	0.052	-271.62	-119.78	-141.25	-20.27	-146.312	-77.586
N+0.21	C3	ENVOLVENTE MII	0.078	-271.43	-119.78	-141.25	-20.27	-142.645	-74.476
N+0.21	C3	ENVOLVENTE MII	0.104	-271.25	-119.78	-141.25	-20.27	-138.977	-71.367
N+0.21	C3	ENVOLVENTE MII	0.13	-271.06	-119.78	-141.25	-20.27	-135.31	-68.259
N+0.21	C3	ENVOLVENTE MII	0.156	-270.87	-119.78	-141.25	-20.27	-131.644	-65.15
N+0.21	C3	ENVOLVENTE MII	0.182	-270.69	-119.78	-141.25	-20.27	-127.977	-62.043
N+0.21	C3	ENVOLVENTE MII	0.208	-270.5	-119.78	-141.25	-20.27	-124.311	-58.935
N+0.21	C3	ENVOLVENTE MII	0.234	-270.31	-119.78	-141.25	-20.27	-120.645	-55.829
N+0.21	C3	ENVOLVENTE MII	0.26	-270.12	-119.78	-141.25	-20.27	-116.98	-52.723
N+1.83	C4	ENVOLVENTE MAI	0	-68.19	119.65	251.98	28.166	43.564	-7.147
N+1.83	C4	ENVOLVENTE MAI	0.081	-67.76	119.65	251.98	28.166	25.065	-10.584
N+1.83	C4	ENVOLVENTE MAI	0.162	-67.32	119.65	251.98	28.166	6.588	-12.595
N+1.83	C4	ENVOLVENTE MAI	0.243	-66.88	119.65	251.98	28.166	-11.818	-13.426
N+1.83	C4	ENVOLVENTE MAI	0.324	-66.45	119.65	251.98	28.166	-14.014	-13.513
N+1.83	C4	ENVOLVENTE MAI	0.405	-66.01	119.65	251.98	28.166	1.392	-13.18
N+1.83	C4	ENVOLVENTE MAI	0.486	-65.57	119.65	251.98	28.166	16.875	-12.605
N+1.83	C4	ENVOLVENTE MAI	0.567	-65.13	119.65	251.98	28.166	32.376	-11.886
N+1.83	C4	ENVOLVENTE MAI	0.648	-64.7	119.65	251.98	28.166	47.888	-11.074
N+1.83	C4	ENVOLVENTE MAI	0.729	-64.26	119.65	251.98	28.166	63.409	-10.201
N+1.83	C4	ENVOLVENTE MAI	0.81	-63.82	119.65	251.98	28.166	78.936	-9.284
N+1.83	C4	ENVOLVENTE MII	0	-241.87	-13.35	-192.24	-25.406	-97.73	-48.41
N+1.83	C4	ENVOLVENTE MII	0.081	-241.29	-13.35	-192.24	-25.406	-84.07	-53.582
N+1.83	C4	ENVOLVENTE MII	0.162	-240.7	-13.35	-192.24	-25.406	-70.431	-60.181
N+1.83	C4	ENVOLVENTE MII	0.243	-240.12	-13.35	-192.24	-25.406	-56.865	-67.96
N+1.83	C4	ENVOLVENTE MII	0.324	-239.54	-13.35	-192.24	-25.406	-60.275	-76.482
N+1.83	C4	ENVOLVENTE MII	0.405	-238.95	-13.35	-192.24	-25.406	-79.752	-85.426
N+1.83	C4	ENVOLVENTE MII	0.486	-238.37	-13.35	-192.24	-25.406	-100.074	-94.61
N+1.83	C4	ENVOLVENTE MII	0.567	-237.79	-13.35	-192.24	-25.406	-120.414	-103.939
N+1.83	C4	ENVOLVENTE MII	0.648	-237.21	-13.35	-192.24	-25.406	-140.765	-113.361
N+1.83	C4	ENVOLVENTE MII	0.729	-236.62	-13.35	-192.24	-25.406	-161.124	-122.844
N+1.83	C4	ENVOLVENTE MII	0.81	-236.04	-13.35	-192.24	-25.406	-181.489	-132.37
N+1.02	C4	ENVOLVENTE MAI	0	-72.57	123.28	254.8	28.166	231.703	67.05
N+1.02	C4	ENVOLVENTE MAI	0.081	-72.13	123.28	254.8	28.166	212.816	57.206
N+1.02	C4	ENVOLVENTE MAI	0.162	-71.69	123.28	254.8	28.166	193.936	47.385
N+1.02	C4	ENVOLVENTE MAI	0.243	-71.26	123.28	254.8	28.166	175.063	37.596
N+1.02	C4	ENVOLVENTE MAI	0.324	-70.82	123.28	254.8	28.166	156.198	29.212
N+1.02	C4	ENVOLVENTE MAI	0.405	-70.38	123.28	254.8	28.166	137.343	22.536
N+1.02	C4	ENVOLVENTE MAI	0.486	-69.94	123.28	254.8	28.166	118.521	15.957
N+1.02	C4	ENVOLVENTE MAI	0.567	-69.51	123.28	254.8	28.166	99.757	9.532
N+1.02	C4	ENVOLVENTE MAI	0.648	-69.07	123.28	254.8	28.166	81.009	3.369
N+1.02	C4	ENVOLVENTE MAI	0.729	-68.63	123.28	254.8	28.166	62.277	-2.321
N+1.02	C4	ENVOLVENTE MAI	0.81	-68.19	123.28	254.8	28.166	43.564	-7.147
N+1.02	C4	ENVOLVENTE MII	0	-247.7	-16.98	-195.06	-25.406	-237.481	-36.509
N+1.02	C4	ENVOLVENTE MII	0.081	-247.12	-16.98	-195.06	-25.406	-223.434	-35.275
N+1.02	C4	ENVOLVENTE MII	0.162	-246.54	-16.98	-195.06	-25.406	-209.392	-34.064
N+1.02	C4	ENVOLVENTE MII	0.243	-245.95	-16.98	-195.06	-25.406	-195.357	-32.885
N+1.02	C4	ENVOLVENTE MII	0.324	-245.37	-16.98	-195.06	-25.406	-181.331	-33.11
N+1.02	C4	ENVOLVENTE MII	0.405	-244.79	-16.98	-195.06	-25.406	-167.315	-35.045
N+1.02	C4	ENVOLVENTE MII	0.486	-244.2	-16.98	-195.06	-25.406	-153.332	-37.075
N+1.02	C4	ENVOLVENTE MII	0.567	-243.62	-16.98	-195.06	-25.406	-139.407	-39.26
N+1.02	C4	ENVOLVENTE MII	0.648	-243.04	-16.98	-195.06	-25.406	-125.497	-41.707
N+1.02	C4	ENVOLVENTE MII	0.729	-242.45	-16.98	-195.06	-25.406	-111.604	-44.626
N+1.02	C4	ENVOLVENTE MII	0.81	-241.87	-16.98	-195.06	-25.406	-97.73	-48.41
N+0.21	C4	ENVOLVENTE MAI	0	-73.97	123.7	255.2	28.166	296.128	98.815
N+0.21	C4	ENVOLVENTE MAI	0.026	-73.83	123.7	255.2	28.166	289.505	95.633
N+0.21	C4	ENVOLVENTE MAI	0.052	-73.69	123.7	255.2	28.166	282.883	92.451
N+0.21	C4	ENVOLVENTE MAI	0.078	-73.55	123.7	255.2	28.166	276.262	89.271
N+0.21	C4	ENVOLVENTE MAI	0.104	-73.41	123.7	255.2	28.166	269.641	86.092
N+0.21	C4	ENVOLVENTE MAI	0.13	-73.27	123.7	255.2	28.166	263.021	82.914
N+0.21	C4	ENVOLVENTE MAI	0.156	-73.13	123.7	255.2	28.166	256.401	79.738
N+0.21	C4	ENVOLVENTE MAI	0.182	-72.99	123.7	255.2	28.166	249.908	76.563
N+0.21	C4	ENVOLVENTE MAI	0.208	-72.85	123.7	255.2	28.166	243.839	73.39
N+0.21	C4	ENVOLVENTE MAI	0.234	-72.71	123.7	255.2	28.166	237.771	70.219
N+0.21	C4	ENVOLVENTE MAI	0.26	-72.57	123.7	255.2	28.166	231.703	67.05
N+0.21	C4	ENVOLVENTE MII	0	-249.57	-17.41	-195.46	-25.406	-286.374	-40.639
N+0.21	C4	ENVOLVENTE MII	0.026	-249.39	-17.41	-195.46	-25.406	-281.305	-40.22

N+0.21	C4	ENVOLVENTE MII	0.052	-249.2	-17.41	-195.46	-25.406	-276.236	-39.802
N+0.21	C4	ENVOLVENTE MII	0.078	-249.01	-17.41	-195.46	-25.406	-271.168	-39.385
N+0.21	C4	ENVOLVENTE MII	0.104	-248.83	-17.41	-195.46	-25.406	-266.1	-38.97
N+0.21	C4	ENVOLVENTE MII	0.13	-248.64	-17.41	-195.46	-25.406	-261.033	-38.556
N+0.21	C4	ENVOLVENTE MII	0.156	-248.45	-17.41	-195.46	-25.406	-255.967	-38.143
N+0.21	C4	ENVOLVENTE MII	0.182	-248.26	-17.41	-195.46	-25.406	-251.027	-37.732
N+0.21	C4	ENVOLVENTE MII	0.208	-248.08	-17.41	-195.46	-25.406	-246.511	-37.322
N+0.21	C4	ENVOLVENTE MII	0.234	-247.89	-17.41	-195.46	-25.406	-241.996	-36.915
N+0.21	C4	ENVOLVENTE MII	0.26	-247.7	-17.41	-195.46	-25.406	-237.481	-36.509
N+1.83	C5	ENVOLVENTE MAI	0	-93.83	149.9	135.75	22.883	55.138	169.712
N+1.83	C5	ENVOLVENTE MAI	0.081	-93.39	149.9	135.75	22.883	45.485	157.745
N+1.83	C5	ENVOLVENTE MAI	0.162	-92.95	149.9	135.75	22.883	35.858	145.801
N+1.83	C5	ENVOLVENTE MAI	0.243	-92.52	149.9	135.75	22.883	26.271	133.885
N+1.83	C5	ENVOLVENTE MAI	0.324	-92.08	149.9	135.75	22.883	16.896	122.005
N+1.83	C5	ENVOLVENTE MAI	0.405	-91.64	149.9	135.75	22.883	19.629	110.173
N+1.83	C5	ENVOLVENTE MAI	0.486	-91.2	149.9	135.75	22.883	33.269	98.407
N+1.83	C5	ENVOLVENTE MAI	0.567	-90.77	149.9	135.75	22.883	47.086	86.733
N+1.83	C5	ENVOLVENTE MAI	0.648	-90.33	149.9	135.75	22.883	60.931	75.208
N+1.83	C5	ENVOLVENTE MAI	0.729	-89.89	149.9	135.75	22.883	74.787	64.043
N+1.83	C5	ENVOLVENTE MAI	0.81	-89.45	149.9	135.75	22.883	88.647	54.089
N+1.83	C5	ENVOLVENTE MII	0	-230.92	-148.73	-171.34	-22.678	-52.541	-175.388
N+1.83	C5	ENVOLVENTE MII	0.081	-230.34	-148.73	-171.34	-22.678	-40.005	-163.516
N+1.83	C5	ENVOLVENTE MII	0.162	-229.76	-148.73	-171.34	-22.678	-27.497	-151.666
N+1.83	C5	ENVOLVENTE MII	0.243	-229.17	-148.73	-171.34	-22.678	-15.028	-139.845
N+1.83	C5	ENVOLVENTE MII	0.324	-228.59	-148.73	-171.34	-22.678	-2.77	-128.06
N+1.83	C5	ENVOLVENTE MII	0.405	-228.01	-148.73	-171.34	-22.678	-2.621	-116.322
N+1.83	C5	ENVOLVENTE MII	0.486	-227.43	-148.73	-171.34	-22.678	-13.379	-104.65
N+1.83	C5	ENVOLVENTE MII	0.567	-226.84	-148.73	-171.34	-22.678	-24.313	-93.072
N+1.83	C5	ENVOLVENTE MII	0.648	-226.26	-148.73	-171.34	-22.678	-35.277	-81.641
N+1.83	C5	ENVOLVENTE MII	0.729	-225.68	-148.73	-171.34	-22.678	-46.25	-70.571
N+1.83	C5	ENVOLVENTE MII	0.81	-225.09	-148.73	-171.34	-22.678	-57.229	-60.711
N+1.02	C5	ENVOLVENTE MAI	0	-98.2	151.95	138.26	22.883	164.87	291.556
N+1.02	C5	ENVOLVENTE MAI	0.081	-97.76	151.95	138.26	22.883	153.683	279.337
N+1.02	C5	ENVOLVENTE MAI	0.162	-97.33	151.95	138.26	22.883	142.499	267.123
N+1.02	C5	ENVOLVENTE MAI	0.243	-96.89	151.95	138.26	22.883	131.32	254.914
N+1.02	C5	ENVOLVENTE MAI	0.324	-96.45	151.95	138.26	22.883	120.15	242.713
N+1.02	C5	ENVOLVENTE MAI	0.405	-96.02	151.95	138.26	22.883	108.993	230.518
N+1.02	C5	ENVOLVENTE MAI	0.486	-95.58	151.95	138.26	22.883	97.862	218.332
N+1.02	C5	ENVOLVENTE MAI	0.567	-95.14	151.95	138.26	22.883	86.777	206.157
N+1.02	C5	ENVOLVENTE MAI	0.648	-94.7	151.95	138.26	22.883	75.771	193.993
N+1.02	C5	ENVOLVENTE MAI	0.729	-94.27	151.95	138.26	22.883	64.943	181.844
N+1.02	C5	ENVOLVENTE MAI	0.81	-93.83	151.95	138.26	22.883	55.138	169.712
N+1.02	C5	ENVOLVENTE MII	0	-236.76	-150.78	-173.84	-22.678	-191.094	-296.285
N+1.02	C5	ENVOLVENTE MII	0.081	-236.17	-150.78	-173.84	-22.678	-177.025	-284.161
N+1.02	C5	ENVOLVENTE MII	0.162	-235.59	-150.78	-173.84	-22.678	-162.959	-272.042
N+1.02	C5	ENVOLVENTE MII	0.243	-235.01	-150.78	-173.84	-22.678	-148.898	-259.928
N+1.02	C5	ENVOLVENTE MII	0.324	-234.42	-150.78	-173.84	-22.678	-134.846	-247.821
N+1.02	C5	ENVOLVENTE MII	0.405	-233.84	-150.78	-173.84	-22.678	-120.807	-235.721
N+1.02	C5	ENVOLVENTE MII	0.486	-233.26	-150.78	-173.84	-22.678	-106.793	-223.63
N+1.02	C5	ENVOLVENTE MII	0.567	-232.67	-150.78	-173.84	-22.678	-92.827	-211.549
N+1.02	C5	ENVOLVENTE MII	0.648	-232.09	-150.78	-173.84	-22.678	-78.938	-199.48
N+1.02	C5	ENVOLVENTE MII	0.729	-231.51	-150.78	-173.84	-22.678	-65.228	-187.425
N+1.02	C5	ENVOLVENTE MII	0.81	-230.92	-150.78	-173.84	-22.678	-52.541	-175.388
N+0.21	C5	ENVOLVENTE MAI	0	-99.61	152.14	138.45	22.883	200.835	330.832
N+0.21	C5	ENVOLVENTE MAI	0.026	-99.47	152.14	138.45	22.883	197.237	326.903
N+0.21	C5	ENVOLVENTE MAI	0.052	-99.33	152.14	138.45	22.883	193.64	322.974
N+0.21	C5	ENVOLVENTE MAI	0.078	-99.18	152.14	138.45	22.883	190.043	319.045
N+0.21	C5	ENVOLVENTE MAI	0.104	-99.04	152.14	138.45	22.883	186.447	315.117
N+0.21	C5	ENVOLVENTE MAI	0.13	-98.9	152.14	138.45	22.883	182.85	311.189
N+0.21	C5	ENVOLVENTE MAI	0.156	-98.76	152.14	138.45	22.883	179.254	307.261
N+0.21	C5	ENVOLVENTE MAI	0.182	-98.62	152.14	138.45	22.883	175.657	303.334
N+0.21	C5	ENVOLVENTE MAI	0.208	-98.48	152.14	138.45	22.883	172.061	299.408
N+0.21	C5	ENVOLVENTE MAI	0.234	-98.34	152.14	138.45	22.883	168.466	295.482
N+0.21	C5	ENVOLVENTE MAI	0.26	-98.2	152.14	138.45	22.883	164.87	291.556
N+0.21	C5	ENVOLVENTE MII	0	-238.63	-150.97	-174.03	-22.678	-236.31	-335.258
N+0.21	C5	ENVOLVENTE MII	0.026	-238.44	-150.97	-174.03	-22.678	-231.788	-331.359
N+0.21	C5	ENVOLVENTE MII	0.052	-238.25	-150.97	-174.03	-22.678	-227.266	-327.46
N+0.21	C5	ENVOLVENTE MII	0.078	-238.07	-150.97	-174.03	-22.678	-222.744	-323.562
N+0.21	C5	ENVOLVENTE MII	0.104	-237.88	-150.97	-174.03	-22.678	-218.222	-319.664
N+0.21	C5	ENVOLVENTE MII	0.13	-237.69	-150.97	-174.03	-22.678	-213.7	-315.766
N+0.21	C5	ENVOLVENTE MII	0.156	-237.51	-150.97	-174.03	-22.678	-209.179	-311.869
N+0.21	C5	ENVOLVENTE MII	0.182	-237.32	-150.97	-174.03	-22.678	-204.657	-307.972
N+0.21	C5	ENVOLVENTE MII	0.208	-237.13	-150.97	-174.03	-22.678	-200.136	-304.076
N+0.21	C5	ENVOLVENTE MII	0.234	-236.94	-150.97	-174.03	-22.678	-195.615	-300.181
N+0.21	C5	ENVOLVENTE MII	0.26	-236.76	-150.97	-174.03	-22.678	-191.094	-296.285
N+2.64	C6	ENVOLVENTE MAI	0	-95.12	164.21	104.47	26.795	17.76	124.489



PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, IPIALES (NARIÑO)
DATOS DE SALIDA DEL MODELO

N+2.64	C6	ENVOLVENTE MAI	0.081	-94.68	164.21	104.47	26.795	25.284	112.438
N+2.64	C6	ENVOLVENTE MAI	0.162	-94.24	164.21	104.47	26.795	32.821	100.95
N+2.64	C6	ENVOLVENTE MAI	0.243	-93.8	164.21	104.47	26.795	40.365	90.052
N+2.64	C6	ENVOLVENTE MAI	0.324	-93.37	164.21	104.47	26.795	47.913	79.741
N+2.64	C6	ENVOLVENTE MAI	0.405	-92.93	164.21	104.47	26.795	55.464	70.223
N+2.64	C6	ENVOLVENTE MAI	0.486	-92.49	164.21	104.47	26.795	63.019	62.115
N+2.64	C6	ENVOLVENTE MAI	0.567	-92.06	164.21	104.47	26.795	70.575	55.814
N+2.64	C6	ENVOLVENTE MAI	0.648	-91.62	164.21	104.47	26.795	78.132	51.935
N+2.64	C6	ENVOLVENTE MAI	0.729	-91.18	164.21	104.47	26.795	85.691	51.147
N+2.64	C6	ENVOLVENTE MAI	0.81	-90.74	164.21	104.47	26.795	93.251	53.7
N+2.64	C6	ENVOLVENTE MII	0	-234.27	-165.08	-93.44	-26.559	-34.921	-126.376
N+2.64	C6	ENVOLVENTE MII	0.081	-233.68	-165.08	-93.44	-26.559	-43.338	-114.255
N+2.64	C6	ENVOLVENTE MII	0.162	-233.1	-165.08	-93.44	-26.559	-51.768	-102.696
N+2.64	C6	ENVOLVENTE MII	0.243	-232.52	-165.08	-93.44	-26.559	-60.204	-91.727
N+2.64	C6	ENVOLVENTE MII	0.324	-231.93	-165.08	-93.44	-26.559	-68.645	-81.345
N+2.64	C6	ENVOLVENTE MII	0.405	-231.35	-165.08	-93.44	-26.559	-77.09	-71.757
N+2.64	C6	ENVOLVENTE MII	0.486	-230.77	-165.08	-93.44	-26.559	-85.537	-63.578
N+2.64	C6	ENVOLVENTE MII	0.567	-230.18	-165.08	-93.44	-26.559	-93.986	-57.207
N+2.64	C6	ENVOLVENTE MII	0.648	-229.6	-165.08	-93.44	-26.559	-102.436	-53.256
N+2.64	C6	ENVOLVENTE MII	0.729	-229.02	-165.08	-93.44	-26.559	-110.888	-52.398
N+2.64	C6	ENVOLVENTE MII	0.81	-228.43	-165.08	-93.44	-26.559	-119.341	-54.88
N+1.83	C6	ENVOLVENTE MAI	0	-99.49	169.43	108.63	26.795	56.211	256.375
N+1.83	C6	ENVOLVENTE MAI	0.081	-99.05	169.43	108.63	26.795	47.815	242.921
N+1.83	C6	ENVOLVENTE MAI	0.162	-98.62	169.43	108.63	26.795	39.435	229.498
N+1.83	C6	ENVOLVENTE MAI	0.243	-98.18	169.43	108.63	26.795	31.078	216.112
N+1.83	C6	ENVOLVENTE MAI	0.324	-97.74	169.43	108.63	26.795	22.753	202.771
N+1.83	C6	ENVOLVENTE MAI	0.405	-97.3	169.43	108.63	26.795	14.465	189.484
N+1.83	C6	ENVOLVENTE MAI	0.486	-96.87	169.43	108.63	26.795	6.223	176.263
N+1.83	C6	ENVOLVENTE MAI	0.567	-96.43	169.43	108.63	26.795	-1.724	163.125
N+1.83	C6	ENVOLVENTE MAI	0.648	-95.99	169.43	108.63	26.795	2.072	150.09
N+1.83	C6	ENVOLVENTE MAI	0.729	-95.55	169.43	108.63	26.795	9.886	137.193
N+1.83	C6	ENVOLVENTE MAI	0.81	-95.12	169.43	108.63	26.795	17.76	124.489
N+1.83	C6	ENVOLVENTE MII	0	-240.1	-170.31	-97.61	-26.559	-64.443	-258.97
N+1.83	C6	ENVOLVENTE MII	0.081	-239.51	-170.31	-97.61	-26.559	-56.94	-245.445
N+1.83	C6	ENVOLVENTE MII	0.162	-238.93	-170.31	-97.61	-26.559	-49.453	-231.951
N+1.83	C6	ENVOLVENTE MII	0.243	-238.35	-170.31	-97.61	-26.559	-41.989	-218.495
N+1.83	C6	ENVOLVENTE MII	0.324	-237.77	-170.31	-97.61	-26.559	-34.557	-205.083
N+1.83	C6	ENVOLVENTE MII	0.405	-237.18	-170.31	-97.61	-26.559	-27.161	-191.725
N+1.83	C6	ENVOLVENTE MII	0.486	-236.6	-170.31	-97.61	-26.559	-19.813	-178.434
N+1.83	C6	ENVOLVENTE MII	0.567	-236.02	-170.31	-97.61	-26.559	-12.758	-165.224
N+1.83	C6	ENVOLVENTE MII	0.648	-235.43	-170.31	-97.61	-26.559	-17.447	-152.119
N+1.83	C6	ENVOLVENTE MII	0.729	-234.85	-170.31	-97.61	-26.559	-26.154	-139.152
N+1.83	C6	ENVOLVENTE MII	0.81	-234.27	-170.31	-97.61	-26.559	-34.921	-126.376
N+1.02	C6	ENVOLVENTE MAI	0	-103.86	171.48	110.5	26.795	142.655	393.505
N+1.02	C6	ENVOLVENTE MAI	0.081	-103.43	171.48	110.5	26.795	133.709	379.734
N+1.02	C6	ENVOLVENTE MAI	0.162	-102.99	171.48	110.5	26.795	124.765	365.973
N+1.02	C6	ENVOLVENTE MAI	0.243	-102.55	171.48	110.5	26.795	116.12	352.222
N+1.02	C6	ENVOLVENTE MAI	0.324	-102.12	171.48	110.5	26.795	107.55	338.481
N+1.02	C6	ENVOLVENTE MAI	0.405	-101.68	171.48	110.5	26.795	98.982	324.754
N+1.02	C6	ENVOLVENTE MAI	0.486	-101.24	171.48	110.5	26.795	90.417	311.041
N+1.02	C6	ENVOLVENTE MAI	0.567	-100.8	171.48	110.5	26.795	81.854	297.344
N+1.02	C6	ENVOLVENTE MAI	0.648	-100.37	171.48	110.5	26.795	73.297	283.665
N+1.02	C6	ENVOLVENTE MAI	0.729	-99.93	171.48	110.5	26.795	64.748	270.008
N+1.02	C6	ENVOLVENTE MAI	0.81	-99.49	171.48	110.5	26.795	56.211	256.375
N+1.02	C6	ENVOLVENTE MII	0	-245.93	-172.36	-99.48	-26.559	-141.958	-396.807
N+1.02	C6	ENVOLVENTE MII	0.081	-245.35	-172.36	-99.48	-26.559	-133.906	-382.966
N+1.02	C6	ENVOLVENTE MII	0.162	-244.76	-172.36	-99.48	-26.559	-125.854	-369.134
N+1.02	C6	ENVOLVENTE MII	0.243	-244.18	-172.36	-99.48	-26.559	-118.103	-355.312
N+1.02	C6	ENVOLVENTE MII	0.324	-243.6	-172.36	-99.48	-26.559	-110.425	-341.501
N+1.02	C6	ENVOLVENTE MII	0.405	-243.01	-172.36	-99.48	-26.559	-102.75	-327.702
N+1.02	C6	ENVOLVENTE MII	0.486	-242.43	-172.36	-99.48	-26.559	-95.077	-313.918
N+1.02	C6	ENVOLVENTE MII	0.567	-241.85	-172.36	-99.48	-26.559	-87.408	-300.151
N+1.02	C6	ENVOLVENTE MII	0.648	-241.26	-172.36	-99.48	-26.559	-79.744	-286.401
N+1.02	C6	ENVOLVENTE MII	0.729	-240.68	-172.36	-99.48	-26.559	-72.087	-272.674
N+1.02	C6	ENVOLVENTE MII	0.81	-240.1	-172.36	-99.48	-26.559	-64.443	-258.97
N+0.21	C6	ENVOLVENTE MAI	0	-105.27	171.65	110.65	26.795	171.401	437.783
N+0.21	C6	ENVOLVENTE MAI	0.026	-105.13	171.65	110.65	26.795	168.526	433.352
N+0.21	C6	ENVOLVENTE MAI	0.052	-104.99	171.65	110.65	26.795	165.651	428.921
N+0.21	C6	ENVOLVENTE MAI	0.078	-104.85	171.65	110.65	26.795	162.776	424.492
N+0.21	C6	ENVOLVENTE MAI	0.104	-104.71	171.65	110.65	26.795	159.901	420.063
N+0.21	C6	ENVOLVENTE MAI	0.13	-104.57	171.65	110.65	26.795	157.027	415.634
N+0.21	C6	ENVOLVENTE MAI	0.156	-104.43	171.65	110.65	26.795	154.152	411.207
N+0.21	C6	ENVOLVENTE MAI	0.182	-104.29	171.65	110.65	26.795	151.278	406.78
N+0.21	C6	ENVOLVENTE MAI	0.208	-104.15	171.65	110.65	26.795	148.403	402.354
N+0.21	C6	ENVOLVENTE MAI	0.234	-104.01	171.65	110.65	26.795	145.529	397.929
N+0.21	C6	ENVOLVENTE MAI	0.26	-103.86	171.65	110.65	26.795	142.655	393.505

N+0.21	C6	ENVOLVENTE MII	0	-247.8	-172.52	-99.62	-26.559	-167.838	-441.312
N+0.21	C6	ENVOLVENTE MII	0.026	-247.61	-172.52	-99.62	-26.559	-165.25	-436.858
N+0.21	C6	ENVOLVENTE MII	0.052	-247.43	-172.52	-99.62	-26.559	-162.662	-432.405
N+0.21	C6	ENVOLVENTE MII	0.078	-247.24	-172.52	-99.62	-26.559	-160.074	-427.953
N+0.21	C6	ENVOLVENTE MII	0.104	-247.05	-172.52	-99.62	-26.559	-157.485	-423.501
N+0.21	C6	ENVOLVENTE MII	0.13	-246.87	-172.52	-99.62	-26.559	-154.897	-419.05
N+0.21	C6	ENVOLVENTE MII	0.156	-246.68	-172.52	-99.62	-26.559	-152.309	-414.6
N+0.21	C6	ENVOLVENTE MII	0.182	-246.49	-172.52	-99.62	-26.559	-149.722	-410.15
N+0.21	C6	ENVOLVENTE MII	0.208	-246.3	-172.52	-99.62	-26.559	-147.134	-405.702
N+0.21	C6	ENVOLVENTE MII	0.234	-246.12	-172.52	-99.62	-26.559	-144.546	-401.254
N+0.21	C6	ENVOLVENTE MII	0.26	-245.93	-172.52	-99.62	-26.559	-141.958	-396.807
N+3.45	C7	ENVOLVENTE MAI	0	-56.97	203.25	30.62	18.457	56.844	112.405
N+3.45	C7	ENVOLVENTE MAI	0.081	-56.53	203.25	30.62	18.457	61.958	96.673
N+3.45	C7	ENVOLVENTE MAI	0.162	-56.09	203.25	30.62	18.457	67.088	81.143
N+3.45	C7	ENVOLVENTE MAI	0.243	-55.66	203.25	30.62	18.457	72.23	65.955
N+3.45	C7	ENVOLVENTE MAI	0.324	-55.22	203.25	30.62	18.457	77.384	51.418
N+3.45	C7	ENVOLVENTE MAI	0.405	-54.78	203.25	30.62	18.457	82.548	38.302
N+3.45	C7	ENVOLVENTE MAI	0.486	-54.34	203.25	30.62	18.457	87.725	28.736
N+3.45	C7	ENVOLVENTE MAI	0.567	-53.91	203.25	30.62	18.457	92.914	27.096
N+3.45	C7	ENVOLVENTE MAI	0.648	-53.47	203.25	30.62	18.457	98.115	34.671
N+3.45	C7	ENVOLVENTE MAI	0.729	-53.03	203.25	30.62	18.457	103.328	47.147
N+3.45	C7	ENVOLVENTE MAI	0.81	-52.59	203.25	30.62	18.457	108.553	61.564
N+3.45	C7	ENVOLVENTE MII	0	-178.9	-203.29	-65.31	-18.347	-6.407	-113.293
N+3.45	C7	ENVOLVENTE MII	0.081	-178.32	-203.29	-65.31	-18.347	-8.711	-97.558
N+3.45	C7	ENVOLVENTE MII	0.162	-177.73	-203.29	-65.31	-18.347	-11.031	-82.024
N+3.45	C7	ENVOLVENTE MII	0.243	-177.15	-203.29	-65.31	-18.347	-13.363	-66.833
N+3.45	C7	ENVOLVENTE MII	0.324	-176.57	-203.29	-65.31	-18.347	-15.706	-52.292
N+3.45	C7	ENVOLVENTE MII	0.405	-175.98	-203.29	-65.31	-18.347	-18.061	-39.173
N+3.45	C7	ENVOLVENTE MII	0.486	-175.4	-203.29	-65.31	-18.347	-20.427	-29.603
N+3.45	C7	ENVOLVENTE MII	0.567	-174.82	-203.29	-65.31	-18.347	-22.806	-27.96
N+3.45	C7	ENVOLVENTE MII	0.648	-174.23	-203.29	-65.31	-18.347	-25.197	-35.532
N+3.45	C7	ENVOLVENTE MII	0.729	-173.65	-203.29	-65.31	-18.347	-27.6	-48.005
N+3.45	C7	ENVOLVENTE MII	0.81	-173.07	-203.29	-65.31	-18.347	-30.015	-62.418
N+2.64	C7	ENVOLVENTE MAI	0	-61.34	211.53	34.69	18.457	31.325	280.62
N+2.64	C7	ENVOLVENTE MAI	0.081	-60.91	211.53	34.69	18.457	29.648	263.574
N+2.64	C7	ENVOLVENTE MAI	0.162	-60.47	211.53	34.69	18.457	28.028	246.541
N+2.64	C7	ENVOLVENTE MAI	0.243	-60.03	211.53	34.69	18.457	26.583	229.524
N+2.64	C7	ENVOLVENTE MAI	0.324	-59.59	211.53	34.69	18.457	28.377	212.527
N+2.64	C7	ENVOLVENTE MAI	0.405	-59.16	211.53	34.69	18.457	30.738	195.659
N+2.64	C7	ENVOLVENTE MAI	0.486	-58.72	211.53	34.69	18.457	34.748	178.876
N+2.64	C7	ENVOLVENTE MAI	0.567	-58.28	211.53	34.69	18.457	40.197	162.146
N+2.64	C7	ENVOLVENTE MAI	0.648	-57.84	211.53	34.69	18.457	45.72	145.483
N+2.64	C7	ENVOLVENTE MAI	0.729	-57.41	211.53	34.69	18.457	51.273	128.893
N+2.64	C7	ENVOLVENTE MAI	0.81	-56.97	211.53	34.69	18.457	56.844	112.405
N+2.64	C7	ENVOLVENTE MII	0	-184.73	-211.57	-69.39	-18.347	-8.99	-281.543
N+2.64	C7	ENVOLVENTE MII	0.081	-184.15	-211.57	-69.39	-18.347	-4.503	-264.494
N+2.64	C7	ENVOLVENTE MII	0.162	-183.56	-211.57	-69.39	-18.347	-0.072	-247.457
N+2.64	C7	ENVOLVENTE MII	0.243	-182.98	-211.57	-69.39	-18.347	4.182	-230.437
N+2.64	C7	ENVOLVENTE MII	0.324	-182.4	-211.57	-69.39	-18.347	7.414	-213.436
N+2.64	C7	ENVOLVENTE MII	0.405	-181.81	-211.57	-69.39	-18.347	6.817	-196.565
N+2.64	C7	ENVOLVENTE MII	0.486	-181.23	-211.57	-69.39	-18.347	4.448	-179.778
N+2.64	C7	ENVOLVENTE MII	0.567	-180.65	-211.57	-69.39	-18.347	1.809	-163.045
N+2.64	C7	ENVOLVENTE MII	0.648	-180.07	-211.57	-69.39	-18.347	-0.903	-146.378
N+2.64	C7	ENVOLVENTE MII	0.729	-179.48	-211.57	-69.39	-18.347	-3.647	-129.784
N+2.64	C7	ENVOLVENTE MII	0.81	-178.9	-211.57	-69.39	-18.347	-6.407	-113.293
N+1.83	C7	ENVOLVENTE MAI	0	-65.72	216.23	38.03	18.457	52.583	455.104
N+1.83	C7	ENVOLVENTE MAI	0.081	-65.28	216.23	38.03	18.457	49.542	437.631
N+1.83	C7	ENVOLVENTE MAI	0.162	-64.84	216.23	38.03	18.457	46.599	420.162
N+1.83	C7	ENVOLVENTE MAI	0.243	-64.4	216.23	38.03	18.457	44.614	402.697
N+1.83	C7	ENVOLVENTE MAI	0.324	-63.97	216.23	38.03	18.457	42.645	385.236
N+1.83	C7	ENVOLVENTE MAI	0.405	-63.53	216.23	38.03	18.457	40.697	367.781
N+1.83	C7	ENVOLVENTE MAI	0.486	-63.09	216.23	38.03	18.457	38.771	350.332
N+1.83	C7	ENVOLVENTE MAI	0.567	-62.65	216.23	38.03	18.457	36.869	332.89
N+1.83	C7	ENVOLVENTE MAI	0.648	-62.22	216.23	38.03	18.457	34.99	315.456
N+1.83	C7	ENVOLVENTE MAI	0.729	-61.78	216.23	38.03	18.457	33.139	298.032
N+1.83	C7	ENVOLVENTE MAI	0.81	-61.34	216.23	38.03	18.457	31.325	280.62
N+1.83	C7	ENVOLVENTE MII	0	-190.56	-216.27	-72.72	-18.347	-58.349	-456.061
N+1.83	C7	ENVOLVENTE MII	0.081	-189.98	-216.27	-72.72	-18.347	-52.499	-438.585
N+1.83	C7	ENVOLVENTE MII	0.162	-189.4	-216.27	-72.72	-18.347	-46.745	-421.112
N+1.83	C7	ENVOLVENTE MII	0.243	-188.81	-216.27	-72.72	-18.347	-41.95	-403.644
N+1.83	C7	ENVOLVENTE MII	0.324	-188.23	-216.27	-72.72	-18.347	-37.171	-386.18
N+1.83	C7	ENVOLVENTE MII	0.405	-187.65	-216.27	-72.72	-18.347	-32.413	-368.721
N+1.83	C7	ENVOLVENTE MII	0.486	-187.06	-216.27	-72.72	-18.347	-27.677	-351.268
N+1.83	C7	ENVOLVENTE MII	0.567	-186.48	-216.27	-72.72	-18.347	-22.964	-333.823
N+1.83	C7	ENVOLVENTE MII	0.648	-185.9	-216.27	-72.72	-18.347	-18.276	-316.386
N+1.83	C7	ENVOLVENTE MII	0.729	-185.31	-216.27	-72.72	-18.347	-13.614	-298.958



PROYECTO: INSTITUCIÓN EDUCATIVA BARRIO OBRERO, IPIALES (NARIÑO)
DATOS DE SALIDA DEL MODELO

N+1.83	C7	ENVOLVENTE MII	0.81	-184.73	-216.27	-72.72	-18.347	-8.99	-281.543
N+1.02	C7	ENVOLVENTE MA:	0	-70.09	218.1	39.65	18.457	84.35	631.34
N+1.02	C7	ENVOLVENTE MA:	0.081	-69.65	218.1	39.65	18.457	81.155	613.705
N+1.02	C7	ENVOLVENTE MA:	0.162	-69.22	218.1	39.65	18.457	77.961	596.072
N+1.02	C7	ENVOLVENTE MA:	0.243	-68.78	218.1	39.65	18.457	74.77	578.442
N+1.02	C7	ENVOLVENTE MA:	0.324	-68.34	218.1	39.65	18.457	71.581	560.813
N+1.02	C7	ENVOLVENTE MA:	0.405	-67.9	218.1	39.65	18.457	68.397	543.187
N+1.02	C7	ENVOLVENTE MA:	0.486	-67.47	218.1	39.65	18.457	65.217	525.564
N+1.02	C7	ENVOLVENTE MA:	0.567	-67.03	218.1	39.65	18.457	62.043	507.943
N+1.02	C7	ENVOLVENTE MA:	0.648	-66.59	218.1	39.65	18.457	58.877	490.326
N+1.02	C7	ENVOLVENTE MA:	0.729	-66.15	218.1	39.65	18.457	55.722	472.713
N+1.02	C7	ENVOLVENTE MA:	0.81	-65.72	218.1	39.65	18.457	52.583	455.104
N+1.02	C7	ENVOLVENTE MII	0	-196.39	-218.14	-74.35	-18.347	-118.219	-632.332
N+1.02	C7	ENVOLVENTE MII	0.081	-195.81	-218.14	-74.35	-18.347	-112.213	-614.694
N+1.02	C7	ENVOLVENTE MII	0.162	-195.23	-218.14	-74.35	-18.347	-106.209	-597.058
N+1.02	C7	ENVOLVENTE MII	0.243	-194.65	-218.14	-74.35	-18.347	-100.208	-579.423
N+1.02	C7	ENVOLVENTE MII	0.324	-194.06	-218.14	-74.35	-18.347	-94.209	-561.791
N+1.02	C7	ENVOLVENTE MII	0.405	-193.48	-218.14	-74.35	-18.347	-88.214	-544.162
N+1.02	C7	ENVOLVENTE MII	0.486	-192.9	-218.14	-74.35	-18.347	-82.224	-526.535
N+1.02	C7	ENVOLVENTE MII	0.567	-192.31	-218.14	-74.35	-18.347	-76.24	-508.911
N+1.02	C7	ENVOLVENTE MII	0.648	-191.73	-218.14	-74.35	-18.347	-70.264	-491.291
N+1.02	C7	ENVOLVENTE MII	0.729	-191.15	-218.14	-74.35	-18.347	-64.299	-473.674
N+1.02	C7	ENVOLVENTE MII	0.81	-190.56	-218.14	-74.35	-18.347	-58.349	-456.061
N+0.21	C7	ENVOLVENTE MA:	0	-71.49	218.24	39.82	18.457	94.641	687.978
N+0.21	C7	ENVOLVENTE MA:	0.026	-71.35	218.24	39.82	18.457	93.611	682.314
N+0.21	C7	ENVOLVENTE MA:	0.052	-71.21	218.24	39.82	18.457	92.581	676.649
N+0.21	C7	ENVOLVENTE MA:	0.078	-71.07	218.24	39.82	18.457	91.552	670.985
N+0.21	C7	ENVOLVENTE MA:	0.104	-70.93	218.24	39.82	18.457	90.522	665.321
N+0.21	C7	ENVOLVENTE MA:	0.13	-70.79	218.24	39.82	18.457	89.493	659.657
N+0.21	C7	ENVOLVENTE MA:	0.156	-70.65	218.24	39.82	18.457	88.464	653.993
N+0.21	C7	ENVOLVENTE MA:	0.182	-70.51	218.24	39.82	18.457	87.435	648.33
N+0.21	C7	ENVOLVENTE MA:	0.208	-70.37	218.24	39.82	18.457	86.407	642.666
N+0.21	C7	ENVOLVENTE MA:	0.234	-70.23	218.24	39.82	18.457	85.378	637.003
N+0.21	C7	ENVOLVENTE MA:	0.26	-70.09	218.24	39.82	18.457	84.35	631.34
N+0.21	C7	ENVOLVENTE MII	0	-198.27	-218.28	-74.52	-18.347	-137.529	-688.981
N+0.21	C7	ENVOLVENTE MII	0.026	-198.08	-218.28	-74.52	-18.347	-135.598	-683.316
N+0.21	C7	ENVOLVENTE MII	0.052	-197.89	-218.28	-74.52	-18.347	-133.666	-677.65
N+0.21	C7	ENVOLVENTE MII	0.078	-197.71	-218.28	-74.52	-18.347	-131.734	-671.985
N+0.21	C7	ENVOLVENTE MII	0.104	-197.52	-218.28	-74.52	-18.347	-129.803	-666.319
N+0.21	C7	ENVOLVENTE MII	0.13	-197.33	-218.28	-74.52	-18.347	-127.872	-660.654
N+0.21	C7	ENVOLVENTE MII	0.156	-197.14	-218.28	-74.52	-18.347	-125.941	-654.99
N+0.21	C7	ENVOLVENTE MII	0.182	-196.96	-218.28	-74.52	-18.347	-124.01	-649.325
N+0.21	C7	ENVOLVENTE MII	0.208	-196.77	-218.28	-74.52	-18.347	-122.079	-643.66
N+0.21	C7	ENVOLVENTE MII	0.234	-196.58	-218.28	-74.52	-18.347	-120.149	-637.996
N+0.21	C7	ENVOLVENTE MII	0.26	-196.39	-218.28	-74.52	-18.347	-118.219	-632.332
N+1.02	C2-1	ENVOLVENTE MA:	0	-93.16	65.65	46.72	10.626	23.844	30.525
N+1.02	C2-1	ENVOLVENTE MA:	0.047	-92.91	65.65	46.72	10.626	21.746	27.477
N+1.02	C2-1	ENVOLVENTE MA:	0.093	-92.66	65.65	46.72	10.626	19.664	24.43
N+1.02	C2-1	ENVOLVENTE MA:	0.14	-92.41	65.65	46.72	10.626	17.605	21.387
N+1.02	C2-1	ENVOLVENTE MA:	0.186	-92.15	65.65	46.72	10.626	15.576	19.403
N+1.02	C2-1	ENVOLVENTE MA:	0.233	-91.9	65.65	46.72	10.626	13.593	17.526
N+1.02	C2-1	ENVOLVENTE MA:	0.279	-91.65	65.65	46.72	10.626	11.679	15.676
N+1.02	C2-1	ENVOLVENTE MA:	0.326	-91.4	65.65	46.72	10.626	9.877	13.932
N+1.02	C2-1	ENVOLVENTE MA:	0.372	-91.15	65.65	46.72	10.626	8.264	14.168
N+1.02	C2-1	ENVOLVENTE MA:	0.419	-90.9	65.65	46.72	10.626	6.984	19.239
N+1.02	C2-1	ENVOLVENTE MA:	0.465	-90.65	65.65	46.72	10.626	6.262	25.694
N+1.02	C2-1	ENVOLVENTE MII	0	-230.48	-141.48	-46.65	-10.962	-23.442	-40.295
N+1.02	C2-1	ENVOLVENTE MII	0.047	-230.14	-141.48	-46.65	-10.962	-21.347	-33.72
N+1.02	C2-1	ENVOLVENTE MII	0.093	-229.81	-141.48	-46.65	-10.962	-19.268	-27.146
N+1.02	C2-1	ENVOLVENTE MII	0.14	-229.47	-141.48	-46.65	-10.962	-17.212	-20.576
N+1.02	C2-1	ENVOLVENTE MII	0.186	-229.14	-141.48	-46.65	-10.962	-15.187	-15.064
N+1.02	C2-1	ENVOLVENTE MII	0.233	-228.8	-141.48	-46.65	-10.962	-13.207	-9.66
N+1.02	C2-1	ENVOLVENTE MII	0.279	-228.47	-141.48	-46.65	-10.962	-11.297	-4.283
N+1.02	C2-1	ENVOLVENTE MII	0.326	-228.14	-141.48	-46.65	-10.962	-9.498	0.989
N+1.02	C2-1	ENVOLVENTE MII	0.372	-227.8	-141.48	-46.65	-10.962	-7.889	4.794
N+1.02	C2-1	ENVOLVENTE MII	0.419	-227.47	-141.48	-46.65	-10.962	-6.612	2.736
N+1.02	C2-1	ENVOLVENTE MII	0.465	-227.13	-141.48	-46.65	-10.962	-5.893	-0.191
N+1.83	C3-1	ENVOLVENTE MA:	0	-104.69	45.44	76.6	19.738	8.419	44.156
N+1.83	C3-1	ENVOLVENTE MA:	0.016	-104.61	45.44	76.6	19.738	8.137	45.454
N+1.83	C3-1	ENVOLVENTE MA:	0.032	-104.52	45.44	76.6	19.738	7.992	46.757
N+1.83	C3-1	ENVOLVENTE MA:	0.047	-104.44	45.44	76.6	19.738	7.978	48.064
N+1.83	C3-1	ENVOLVENTE MA:	0.063	-104.35	45.44	76.6	19.738	8.092	49.376
N+1.83	C3-1	ENVOLVENTE MA:	0.079	-104.27	45.44	76.6	19.738	8.329	50.691
N+1.83	C3-1	ENVOLVENTE MA:	0.095	-104.18	45.44	76.6	19.738	8.683	52.009
N+1.83	C3-1	ENVOLVENTE MA:	0.11	-104.1	45.44	76.6	19.738	9.148	53.331
N+1.83	C3-1	ENVOLVENTE MA:	0.126	-104.01	45.44	76.6	19.738	10.047	54.655

N+1.83	C3-1	ENVOLVENTE MAI	0.142	-103.93	45.44	76.6	19.738	11.027	55.981
N+1.83	C3-1	ENVOLVENTE MAI	0.158	-103.84	45.44	76.6	19.738	12.042	57.31
N+1.83	C3-1	ENVOLVENTE MII	0	-264.29	-86.82	-77.23	-20.27	-13.611	-14.558
N+1.83	C3-1	ENVOLVENTE MII	0.016	-264.18	-86.82	-77.23	-20.27	-13.32	-15.204
N+1.83	C3-1	ENVOLVENTE MII	0.032	-264.07	-86.82	-77.23	-20.27	-13.164	-15.855
N+1.83	C3-1	ENVOLVENTE MII	0.047	-263.95	-86.82	-77.23	-20.27	-13.141	-16.51
N+1.83	C3-1	ENVOLVENTE MII	0.063	-263.84	-86.82	-77.23	-20.27	-13.244	-17.17
N+1.83	C3-1	ENVOLVENTE MII	0.079	-263.72	-86.82	-77.23	-20.27	-13.471	-17.833
N+1.83	C3-1	ENVOLVENTE MII	0.095	-263.61	-86.82	-77.23	-20.27	-13.815	-18.499
N+1.83	C3-1	ENVOLVENTE MII	0.11	-263.5	-86.82	-77.23	-20.27	-14.27	-19.169
N+1.83	C3-1	ENVOLVENTE MII	0.126	-263.38	-86.82	-77.23	-20.27	-15.159	-19.841
N+1.83	C3-1	ENVOLVENTE MII	0.142	-263.27	-86.82	-77.23	-20.27	-16.129	-20.515
N+1.83	C3-1	ENVOLVENTE MII	0.158	-263.16	-86.82	-77.23	-20.27	-17.134	-21.192
N+2.64	C5-1	ENVOLVENTE MAI	0	-89.45	108.36	101.27	22.883	88.647	54.089
N+2.64	C5-1	ENVOLVENTE MAI	0.058	-89.14	108.36	101.27	22.883	95.88	48.616
N+2.64	C5-1	ENVOLVENTE MAI	0.115	-88.83	108.36	101.27	22.883	103.131	43.254
N+2.64	C5-1	ENVOLVENTE MAI	0.173	-88.52	108.36	101.27	22.883	110.409	38.033
N+2.64	C5-1	ENVOLVENTE MAI	0.23	-88.21	108.36	101.27	22.883	117.724	33.015
N+2.64	C5-1	ENVOLVENTE MAI	0.288	-87.9	108.36	101.27	22.883	125.096	28.502
N+2.64	C5-1	ENVOLVENTE MAI	0.346	-87.59	108.36	101.27	22.883	132.554	24.497
N+2.64	C5-1	ENVOLVENTE MAI	0.403	-87.28	108.36	101.27	22.883	140.12	21.243
N+2.64	C5-1	ENVOLVENTE MAI	0.461	-86.97	108.36	101.27	22.883	147.785	19.18
N+2.64	C5-1	ENVOLVENTE MAI	0.518	-86.66	108.36	101.27	22.883	155.521	18.787
N+2.64	C5-1	ENVOLVENTE MAI	0.576	-86.34	108.36	101.27	22.883	163.302	20.256
N+2.64	C5-1	ENVOLVENTE MII	0	-225.09	-107.19	-136.85	-22.678	-57.229	-60.711
N+2.64	C5-1	ENVOLVENTE MII	0.058	-224.68	-107.19	-136.85	-22.678	-62.412	-55.305
N+2.64	C5-1	ENVOLVENTE MII	0.115	-224.26	-107.19	-136.85	-22.678	-67.615	-50.011
N+2.64	C5-1	ENVOLVENTE MII	0.173	-223.85	-107.19	-136.85	-22.678	-72.843	-44.857
N+2.64	C5-1	ENVOLVENTE MII	0.23	-223.43	-107.19	-136.85	-22.678	-78.109	-39.906
N+2.64	C5-1	ENVOLVENTE MII	0.288	-223.02	-107.19	-136.85	-22.678	-83.433	-35.461
N+2.64	C5-1	ENVOLVENTE MII	0.346	-222.6	-107.19	-136.85	-22.678	-88.842	-31.523
N+2.64	C5-1	ENVOLVENTE MII	0.403	-222.19	-107.19	-136.85	-22.678	-94.358	-28.337
N+2.64	C5-1	ENVOLVENTE MII	0.461	-221.78	-107.19	-136.85	-22.678	-99.974	-26.34
N+2.64	C5-1	ENVOLVENTE MII	0.518	-221.36	-107.19	-136.85	-22.678	-105.661	-26.015
N+2.64	C5-1	ENVOLVENTE MII	0.576	-220.95	-107.19	-136.85	-22.678	-111.394	-27.552
N+3.45	C6-1	ENVOLVENTE MAI	0	-90.74	95.15	61.73	26.795	93.251	53.7
N+3.45	C6-1	ENVOLVENTE MAI	0.016	-90.65	95.15	61.73	26.795	93.928	53.967
N+3.45	C6-1	ENVOLVENTE MAI	0.033	-90.57	95.15	61.73	26.795	94.606	54.277
N+3.45	C6-1	ENVOLVENTE MAI	0.049	-90.48	95.15	61.73	26.795	95.288	54.629
N+3.45	C6-1	ENVOLVENTE MAI	0.065	-90.39	95.15	61.73	26.795	95.972	55.024
N+3.45	C6-1	ENVOLVENTE MAI	0.082	-90.3	95.15	61.73	26.795	96.659	55.458
N+3.45	C6-1	ENVOLVENTE MAI	0.098	-90.21	95.15	61.73	26.795	97.351	55.933
N+3.45	C6-1	ENVOLVENTE MAI	0.114	-90.13	95.15	61.73	26.795	98.047	56.447
N+3.45	C6-1	ENVOLVENTE MAI	0.131	-90.04	95.15	61.73	26.795	98.748	56.998
N+3.45	C6-1	ENVOLVENTE MAI	0.147	-89.95	95.15	61.73	26.795	99.455	57.586
N+3.45	C6-1	ENVOLVENTE MAI	0.163	-89.86	95.15	61.73	26.795	100.168	58.209
N+3.45	C6-1	ENVOLVENTE MII	0	-228.43	-96.02	-50.71	-26.559	-119.341	-54.88
N+3.45	C6-1	ENVOLVENTE MII	0.016	-228.32	-96.02	-50.71	-26.559	-120.197	-55.132
N+3.45	C6-1	ENVOLVENTE MII	0.033	-228.2	-96.02	-50.71	-26.559	-121.056	-55.428
N+3.45	C6-1	ENVOLVENTE MII	0.049	-228.08	-96.02	-50.71	-26.559	-121.917	-55.767
N+3.45	C6-1	ENVOLVENTE MII	0.065	-227.96	-96.02	-50.71	-26.559	-122.781	-56.147
N+3.45	C6-1	ENVOLVENTE MII	0.082	-227.85	-96.02	-50.71	-26.559	-123.649	-56.567
N+3.45	C6-1	ENVOLVENTE MII	0.098	-227.73	-96.02	-50.71	-26.559	-124.52	-57.028
N+3.45	C6-1	ENVOLVENTE MII	0.114	-227.61	-96.02	-50.71	-26.559	-125.396	-57.527
N+3.45	C6-1	ENVOLVENTE MII	0.131	-227.49	-96.02	-50.71	-26.559	-126.277	-58.064
N+3.45	C6-1	ENVOLVENTE MII	0.147	-227.38	-96.02	-50.71	-26.559	-127.164	-58.638
N+3.45	C6-1	ENVOLVENTE MII	0.163	-227.26	-96.02	-50.71	-26.559	-128.057	-59.247