APPENDIX F

Notation

A	Area
ALR	Axial load ratio
A_b	Area of reinforcing bars
A_G	Gross area of concrete member
A_e	Effective area of concrete member in shear $0.8\ A_g$
A_s	Area of tension steel
A_V	Area of shear steel
a_x	Height-wise acceleration amplification
a_r	Resonance acceleration amplification
BSE-1A	Basic safety earthquake for IO performance evaluations
BSE-2	Basic safety earthquake for CP performance evaluations
b	Width of wall section
c	Reinforcing bar cover, or depth to neutral axis
CQC	Complete quadratic combination
d	Depth to reinforcing steel
d_b	Reinforcing bar diameter
DCR	Demand-to-capacity ratio
C_1	FEMA 440 modification factor to relate expected maximum inelastic displacements to displacements calculated for linear elastic response
C_2	FEMA 440 modification factor to relate increases in inelastic displacements due to cyclic degradation
CP	Collapse performance

E	Modulus of elasticity
E_s	Modulus of elasticity of steel
ELF	Equivalent lateral force
F_n	Inertial force at lumped mass location
f'_c	Specified concrete compressive strength
f'_{ca}	Actual concrete compressive strength
f_y	Reinforcing steel yield strength
f_r	Modulus of rupture
f_s	Maximum stress that can be developed by reinforcement
g	Acceleration of gravity
H	Distance or height
h_e	Height of effective wall section for Simple-LSP analysis
h_1	Height from base to mass point 1
h_2	Height from base to mass point 2
I_e	Effective moment of inertia
I_{EB}	Effective moment of inertia at bottom of wall
I_G	Gross moment of inertia
IO	Immediate occupancy
k	Shear capacity factor or stiffness
k^*	Generalized stiffness
l_a	Reinforcing bar anchorage length
l	Length of wall, i.e. height of wall
l_{eff}	Effective length of wall

I_b	Lap or splice length provided
I_d	Lap or splice length required by ACI
l_e	Length of embedment
L_n	Normalization factor
l_p	Plastic hinge length
LDP	Linear dynamic procedure
LSP	Linear static procedure or Simple linear static procedure
LS	*Life safety*
m^*	Generalized mass
M	Moment
M_{CR}	Cracking moment
M_E	Total elastic moment demand for design earthquake loading condition
M_N	Nominal moment capacity
m_n	Lumped mass value
P	Axial load
PSHA	Probabilistic site hazard assessment
Q_E	Combined action due to design earthquake loads, dead load, and live load
Q_D	Dead load effect
Q_L	Live load effect
Q_{DE}	Earthquake load effects for the design earthquake, i.e., MDE or MCE
Q_{E1}	Q_E load case 1 for orthogonal effects determination
Q_{E2}	Q_E load case 2 for orthogonal effects determination

$Q_{DE(X1)}$	Effects resulting from the X_1 component of the design earthquake ground motion occurring in the direction of the 1st principal structure axis
$Q_{DE(X2)}$	Effects resulting from the X_2 component of the design earthquake ground motion occurring in the direction of the 2nd principal structure axis
$Q_{DE(Z)}$	Effects resulting from the vertical component of the design earthquake ground motion occurring in the z-direction
s	Spacing of reinforcing steel
S_A	Spectral acceleration
S_S	Short-period spectral acceleration (0.2-second acceleration)
S_b	Section modulus
S_D	Spectral displacement
SD	Strength design
SDOF	Single degree of freedom
SRSS	Square root of the sum of the squares
T	Fundamental period of vibration of powerhouse superstructure
T_1	Fundamental period of vibration of powerhouse substructure (dry)
T_1^1	Fundamental period of vibration of powerhouse substructure (wet)
T_O	Characteristic ground motion period
V	Shear or base shear
V_C	Shear capacity contribution of concrete
V_S	Shear capacity contribution of steel
V_{SF}	Shear-friction capacity
V_E	Elastic shear demand for design earthquake
W	Weight

W_x	Weight assigned to level x
w_1	Weight assigned to mass point 1
w_2	Weight assigned to mass point 2
α	Coefficient used for combining responses of x and y ground motion components
ϕ	ACI strength reduction factor
ϕ_n	Mode shape function value at lumped mass location
ϕ_u	Ultimate curvature capacity
ϕ_y	Curvature at first yield of reinforcing steel
θ_u	Ultimate rotational capacity
δ_n	Displacement at lumped mass location
δ_U	Ultimate displacement capacity
δ_E or Δ_E	Displacement demand of design earthquake
δ_Y	Yield displacement
δ_C	Displacement capacity
μ_δ	Displacement ductility capacity
μ_E	Displacement ductility demand of design earthquake
μ_{SF}	Shear-friction coefficient
ε_{cu}	Ultimate strain capacity of concrete
ε_{su}	Ultimate strain capacity of steel
ε_y	Yield strain of steel