

Electron object selection			
Selection	Baseline selection	Z selection	W selection
$p_T > 7$ GeV	✓	✓	✓
Electron object quality	✓	✓	✓
$ \eta^{\text{cluster}} < 2.47, \eta < 2.5$	✓	✓	✓
LooseLH+BLayer identification	✓	✓	✓
$ d_0^{\text{BL}}/\sigma(d_0^{\text{BL}}) < 5$	✓	✓	✓
$ \Delta z_0^{\text{BL}} \sin \theta < 0.5$ mm	✓	✓	✓
LooseTrackOnly isolation	✓	✓	✓
e -to- μ and e -to- e overlap removal	✓	✓	✓
e -to-jets overlap removal		✓	✓
$p_T > 15$ GeV		✓	✓
Exclude $1.37 < \eta^{\text{cluster}} < 1.52$		✓	✓
MediumLH identification		✓	✓
Gradient Loose isolation		✓	✓
$p_T > 20$ GeV			✓
TightLH identification			✓
Gradient isolation			✓

Muon object selection			
Selection	Baseline selection	Z selection	W selection
$p_T > 7$ GeV	✓	✓	✓
$ \eta < 2.5$	✓	✓	✓
Loose quality	✓	✓	✓
$ d_0^{\text{BL}}/\sigma(d_0^{\text{BL}}) < 3$	✓	✓	✓
$ \Delta z_0^{\text{BL}} \sin \theta < 0.5$ mm	✓	✓	✓
LooseTrackOnly isolation	✓	✓	✓
μ -jet Overlap Removal		✓	✓
$p_T > 15$ GeV		✓	✓
Medium quality		✓	✓
Gradient Loose isolation		✓	✓
$p_T > 20$ GeV			✓

Event selection

Event cleaning	Reject LAr, Tile and SCT corrupted events and incomplete events
Primary vertex	Hard scattering vertex with at least two tracks
MC trigger (2015)	HLT_e24_lhmedium_L1EM18VH HLT_e60_lhmedium HLT_e120_lhloose HLT_mu20_loose_L1MU15 HLT_mu50
Data trigger (2015)	HLT_e24_lhmedium_L1EM20VH HLT_e60_lhmedium HLT_e120_lhloose HLT_mu20_loose_L1MU15 HLT_mu50
Trigger (2016)	HLT_e26_lhtight_nod0_ivarloose HLT_e60_lhmedium_nod0 HLT_e140_lhloose_nod0 HLT_mu26_ivarmedium HLT_mu50
ZZ veto	Less than 4 baseline leptons
N leptons	Exactly three leptons passing the Z lepton selection
Leading lepton p_T	$p_T^{\text{lead}} > 25$ GeV (in 2015) or $p_T^{\text{lead}} > 27$ GeV (in 2016)
Z leptons	Two same flavor oppositely charged leptons passing Z lepton selection
Mass window	$ M_{\ell\ell} - M_Z < 10$ GeV
W lepton	W lepton passes W selection
W transverse mass	$m_T^W > 30$ GeV
