



**6.3.1 No Build Alternative**

Under the No Build Alternative there will be no construction activities and therefore no construction-related noise or vibration impacts would occur.

**6.3.2 Transportation System Management (TSM) Alternative**

The TSM Alternative requires no construction activities and therefore no construction-related noise or vibration impacts would occur.

**6.3.3 Alternative 1 – Westwood/UCLA Extension**

Potential noise and vibration sensitive receivers within 250 feet and 500 feet of the alignment have been identified based on GIS land use analysis for the proposed project alignment and station locations. There are a total of 17 identified potential noise and vibration sensitive receptors within 250 feet of the proposed alignment and an additional nine potential noise and vibration sensitive receptors within 500 feet of the proposed alignment (see the tables below).

For the proposed Alternative 1 stations, there are three potential noise and vibration sensitive receptors with 250 feet and an additional five potential noise and vibration sensitive receptors with 500 feet (see the tables below).

The types and levels of noise and vibration associated with tunneling and construction activities in the known gassy or potentially gassy areas would be generally the same as those associated with tunneling in the non-gas zones. In both zones, construction activities that generate noise include demolition, station construction, worker travel, hauling of soils and debris for disposal, deliveries of materials, and other related tasks.

Because a Slurry-Face TBM will likely be used for tunneling in the known gassy or potentially gassy areas, the slurry plant would be an additional component of the construction activities and associated noise. Noise from the treatment plant may be mitigated partially by enclosing the plant behind soundwalls or within a building. The noise associated with this single component would not result in higher noise levels as compared to the overall construction activities.



**Table 6-8: Westwood/UCLA Extension - Noise and Vibration Sensitive Receivers Within 250 Feet of Project Alignment**

ID	Name	Category
18	Gayley Center	Cultural
20	Armand Hammer Museum	Museum
21	Westwood Center	Business Center
24	Westwood Presbyterian School	Daycare
36	Carmelite Elder Care Management	Adult Health Care
38	Martyrs Memorial And Museum of the Holocaust	Museum
39	Peter M Khan Memorial Library	Library
40	Petersen Automotive Museum	Museum
41	Los Angeles County Art Museum	Museum
42	German Cultural Center	Cultural
43	Comfort Keepers	Adult Health Care
44	Memorial Branch Los Angeles Public Library	Library
46	Impact Clinical Trials (Adult Daycare)	Adult Health Care
47	Family Home Healthcare	Adult Health Care
48	FS	Fire Station
49	Evergreen Child Care	Daycare
50	Wilshire Adult Day Healthcare	Adult Health Care
Total 17		

**Table 6-9: Westwood/UCLA Extension - Noise and Vibration Sensitive Receivers Within 250 to 500 Feet of Project Alignment**

ID	Name	Category
16	Tishman Building	Business Center
27	Fairburn Avenue Elementary School	Elementary School
28	Fairburn PTA Star Program	Daycare
31	Elder Friends Inc.	Adult Health Care
33	Hebrew Academy Nessah	Daycare
34	Nessah Nursery School	Daycare
35	Horace Mann Elementary School	Elementary School
37	Montessori Children's World	Daycare
45	Wilshire United Methodist Church	Church
Total 9		

**Table 6-10: Westwood/UCLA Extension - Noise and Vibration Sensitive Receivers Within 250 Feet of Proposed Stations**

ID	Name	Category
18	Gayley Center	Cultural
40	Petersen Automotive Museum	Museum
47	Family Home Healthcare	Adult Health Care
Total 3		

**Table 6-11: Westwood/UCLA Extension - Noise and Vibration Sensitive Receivers Within 250 to 500 Feet of Proposed Stations**

ID	Name	Category
16	Tishman Building	Business Center
17	Unisys Building	Business Center
36	Carmelite Elder Care Management	Adult Health Care
37	Montessori Children's World	Daycare
43	Comfort Keepers	Adult Health Care
Total 5		

### 6.3.4 Alternative 2 – Westwood/VA Hospital Extension

Potential noise and vibration sensitive receivers within 250 feet and 500 feet of Alternative 2 have been identified based on GIS land use analysis for the proposed project alignment and station locations (see the tables below). There are a total of 17 identified potential noise and vibration sensitive receptors within 250 feet of the proposed alignment and an additional nine potential noise and vibration sensitive receptors within 500 feet of the proposed alignment.

For the proposed stations along Alternative 2, there are three potential noise and vibration sensitive receptors with 250 feet and an additional five potential noise and vibration sensitive receptors with 500 feet (see the tables below).

**Table 6-12: Alternative 2 - Westwood/VA Hospital Extension - Noise and Vibration Sensitive Receivers Within 250 Feet of Project Alignment**

ID	Name	Category
18	Gayley Center	Cultural
20	Armand Hammer Museum	Museum
21	Westwood Center	Business Center
24	Westwood Presbyterian School	Daycare
36	Carmelite Elder Care Management	Adult Health Care
38	Martyrs Memorial And Museum of the Holocaust	Museum
39	Peter M Khan Memorial Library	Library
40	Petersen Automotive Museum	Museum
41	Los Angeles County Art Museum	Museum
42	German Cultural Center	Cultural
43	Comfort Keepers	Adult Health Care
44	Memorial Branch Los Angeles Public Library	Library
46	Impact Clinical Trials (Adult Daycare)	Adult Health Care
47	Family Home Healthcare	Adult Health Care
48	FS	Fire Station
49	Evergreen Child Care	Daycare
50	Wilshire Adult Day Healthcare	Adult Health Care
Total 17		



**Table 6-13: Alternative 2 - Westwood/VA Hospital Extension - Noise and Vibration Sensitive Receivers Within 250 to 500 Feet of Project Alignment**

ID	Name	Category
16	Tishman Building	Business Center
27	Fairburn Avenue Elementary School	Elementary School
28	Fairburn PTA Star Program	Daycare
31	Elder Friends Inc.	Adult Health Care
33	Hebrew Academy Nessah	Daycare
34	Nessah Nursery School	Daycare
35	Horace Mann Elementary School	Elementary School
37	Montessori Children's World	Daycare
45	Wilshire United Methodist Church	Church
Total 9		

**Table 6-14: Alternative 2 - Westwood/VA Hospital Extension - Noise and Vibration Sensitive Receivers Within 250 Feet of Proposed Stations**

ID	Name	Category
18	Gayley Center	Cultural
40	Petersen Automotive Museum	Museum
47	Family Home Healthcare	Adult Health Care
Total 3		

**Table 6-15: Alternative 2 - Westwood/VA Hospital Extension - Noise and Vibration Sensitive Receivers Within 250 to 500 Feet of Proposed Stations**

ID	Name	Category
16	Tishman Building	Business Center
17	Unisys Building	Business Center
36	Carmelite Elder Care Management	Adult Health Care
37	Montessori Children's World	Daycare
43	Comfort Keepers	Adult Health Care
Total 5		

**6.3.5 Alternative 3 – Santa Monica Extension**

Potential noise and vibration sensitive receivers within 250 feet and 500 feet of Alternative 3 have been identified based on GIS land use analysis for the proposed project alignment and station locations (see the tables below). A total of 27 potential noise and vibration sensitive receptors were identified within 250 feet of the proposed alignment and an additional 14 potential noise and vibration sensitive receptors were within 500 feet of the proposed alignment.

For the proposed stations along Alternative 3, there are nine potential noise and vibration sensitive receptors with 250 feet and an additional six potential noise and vibration sensitive receptors with 500 feet (see the tables below).

**Table 6-16: Alternative 3 - Santa Monica Extension - Noise and Vibration Sensitive Receivers Within 250 Feet of Project Alignment**

<b>ID</b>	<b>Name</b>	<b>Category</b>
1	First Presbyterian Nursery	Daycare
2	Delphi Academy of Santa Monica	Daycare
3	Getty Center for the History of Art and the Humanities	Museum
4	Church of Saint Augustine By-The-Sea	Church
5	Nichiren Shoshu of America Temple	Church
8	Santa Monica Hospital Medical	Hospital
10	Pilgrim Lutheran Pre-School	Daycare
11	Pilgrim Lutheran Church	Church
12	The Lighthouse Church	Church
13	Cassidy Pre-School	Daycare
18	Gayley Center	Cultural
20	Armand Hammer Museum	Museum
21	Westwood Center	Business Center
24	Westwood Presbyterian School	Daycare
36	Carmelite Elder Care Management	Adult Health Care
38	Martyrs Memorial And Museum of the Holocaust	Museum
39	Peter M Khan Memorial Library	Library
40	Petersen Automotive Museum	Museum
41	Los Angeles County Art Museum	Museum
42	German Cultural Center	Cultural
43	Comfort Keepers	Adult Health Care
44	Memorial Branch Los Angeles Public Library	Library
46	Impact Clinical Trials (Adult Daycare)	Adult Health Care
47	Family Home Healthcare	Adult Health Care
48	FS	Fire Station
49	Evergreen Child Care	Daycare
50	Wilshire Adult Day Healthcare	Adult Health Care
Total 27		



**Table 6-17. Alternative 3 – Santa Monica Extension – Noise and Vibration Sensitive Receivers within 250 to 500 feet of Project Alignment**

ID	Name	Category
6	Joslyn Hall	Adult Health Care
7	Miles Memorial Playhouse	Cultural
9	UCLA Medical Center Orthopedic Hospital	Hospital
14	St Johns Hospital Health Center	Hospital
15	Mariner Post-Acute	Adult Health Care
16	Tishman Building	Business Center
27	Fairburn Avenue Elementary School	Elementary School
28	Fairburn PTA Star Program	Daycare
31	Elder Friends Inc.	Adult Health Care
33	Hebrew Academy Nessah	Daycare
34	Nessah Nursery School	Daycare
35	Horace Mann Elementary School	Elementary School
37	Montessori Children's World	Daycare
45	Wilshire United Methodist Church	Church
Total 14		

**Table 6-18: Alternative 3 - Santa Monica Extension - Noise and Vibration Sensitive Receivers Within 250 Feet of Proposed Stations**

ID	Name	Category
1	First Presbyterian Nursery	Daycare
2	Delphi Academy of Santa Monica	Daycare
3	Getty Center for the History of Art and the Humanities	Museum
4	Church of Saint Augustine By-The-Sea	Church
5	Nichiren Shoshu of America Temple	Church
8	Santa Monica Hospital Medical	Hospital
18	Gayley Center	Cultural
40	Petersen Automotive Museum	Museum
47	Family Home Healthcare	Adult Health Care
Total 9		

**Table 6-19: Alternative 3 - Santa Monica Extension - Noise and Vibration Sensitive Receivers Within 250 to 500 Feet of Proposed Stations**

ID	Name	Category
9	UCLA Medical Center Orthopedic Hospital	Hospital
16	Tishman Building	Business Center
17	Unisys Building	Business Center
36	Carmelite Elder Care Management	Adult Health Care
37	Montessori Children's World	Daycare
43	Comfort Keepers	Adult Health Care
Total 6		



**6.3.6 Alternative 4 – Westwood/VA Hospital Extension plus West Hollywood Extension**

Potential noise and vibration sensitive receivers within 250 feet and 500 feet of Alternative 4 have been identified based on GIS land use analysis for the proposed project alignment and station locations (see the tables below). A total of 26 potential noise and vibration sensitive receptors were identified within 250 feet of the proposed alignment, and an additional 16 potential noise and vibration sensitive receptors were identified within 500 feet of the proposed alignment.

For the proposed stations along Alternative 4, there are four potential noise and vibration sensitive receptors with 250 feet and an additional seven potential noise and vibration sensitive receptors with 500 feet (see the tables below).

**Table 6-20: Alternative 4 - Westwood/VA Hospital Extension + West Hollywood Extension - Noise and Vibration Sensitive Receivers Within 250 Feet of Project Alignment**

ID	Name	Category
18	Gayley Center	Cultural
20	Armand Hammer Museum	Museum
21	Westwood Center	Business Center
24	Westwood Presbyterian School	Daycare
36	Carmelite Elder Care Management	Adult Health Care
38	Martyrs Memorial And Museum of the Holocaust	Museum
39	Peter M Khan Memorial Library	Library
40	Petersen Automotive Museum	Museum
41	Los Angeles County Art Museum	Museum
42	German Cultural Center	Cultural
43	Comfort Keepers	Adult Health Care
44	Memorial Branch Los Angeles Public Library	Library
46	Impact Clinical Trials (Adult Daycare)	Adult Health Care
47	Family Home Healthcare	Adult Health Care
48	FS	Fire Station
49	Evergreen Child Care	Daycare
50	Wilshire Adult Day Healthcare	Adult Health Care
53	West Hollywood Branch County of Los Angeles Public	Library
54	West Hollywood Library	Library
57	Beverly Hills Montessori School	Daycare
58	Fountain Day School	Daycare
59	L' Chaim Daycare	Daycare
60	FS	Fire Station
62	West Hollywood Pre-School	Daycare
63	Partners Adult Day Healthcare	Adult Health Care
64	Hollywood Little Red School House	Daycare
Total 26		



**Table 6-21: Alternative 4 - Westwood/VA Hospital Extension + West Hollywood Extension - Noise and Vibration Sensitive Receivers Within 250 to 500 Feet of Project Alignment**

ID	Name	Category
16	Tishman Building	Business Center
27	Fairburn Avenue Elementary School	Elementary School
28	Fairburn PTA Star Program	Daycare
31	Elder Friends Inc.	Adult Health Care
33	Hebrew Academy Nessah	Daycare
34	Nessah Nursery School	Daycare
35	Horace Mann Elementary School	Elementary School
37	Montessori Children's World	Daycare
45	Wilshire United Methodist Church	Church
51	Cedars-Sinai Medical Center	Hospital
52	Mainmonides Academy	Daycare
55	Pacific Design Center	cultural
56	The Holloway School	Daycare
61	Raya's Paradise	Adult Health Care
65	Hollywood Senior High School	High School
66	Blessed Sacrament School	Private School
Total 16		

**Table 6-22: Alternative 4 - Westwood/VA Hospital Extension + West Hollywood Extension - Noise and Vibration Sensitive Receivers Within 250 Feet of Proposed Stations**

ID	Name	Category
18	Gayley Center	Cultural
40	Petersen Automotive Museum	Museum
47	Family Home Healthcare	Adult Health Care
58	Fountain Day School	Daycare
Total 4		

**Table 6-23: Alternative 4 - Westwood/VA Hospital Extension + West Hollywood Extension - Noise and Vibration Sensitive Receivers Within 250 to 500 Feet of Proposed Stations**

ID	Name	Category
16	Tishman Building	Business Center
17	Unisys Building	Business Center
36	Carmelite Elder Care Management	Adult Health Care
37	Montessori Children's World	Daycare
43	Comfort Keepers	Adult Health Care
65	Hollywood Senior High School	High School
66	Blessed Sacrament School	Private School
Total 7		

### 6.3.7 Alternative 5 – Santa Monica Extension plus West Hollywood Extension

Potential noise and vibration sensitive receivers within 250 feet and 500 feet of Alternative 5 have been identified based on GIS land use analysis for the proposed project alignment and station locations (see the tables below). There are a total of 36 identified potential noise and





vibration sensitive receptors within 250 feet of the proposed alignment and an additional 21 potential noise and vibration sensitive receptors within 500 feet of the proposed alignment.

For the proposed stations along Alternative 5, there are ten potential noise and vibration sensitive receptors with 250 feet and an additional eight potential noise and vibration sensitive receptors with 500 feet (see the tables below).

**Table 6-24: Alternative 5 - Santa Monica Extension + West Hollywood Extension - Noise and Vibration Sensitive Receivers Within 250 Feet of Project Alignment**

ID	Name	Category
1	First Presbyterian Nursery	Daycare
2	Delphi Academy of Santa Monica	Daycare
3	Getty Center for the History of Art and the Humanities	Museum
4	Church of Saint Augustine By-The-Sea	Church
5	Nichiren Shoshu of America Temple	Church
8	Santa Monica Hospital Medical	Hospital
10	Pilgrim Lutheran Pre-School	Daycare
11	Pilgrim Lutheran Church	Church
12	The Lighthouse Church	Church
13	Cassidy Pre-School	Daycare
18	Gayley Center	Cultural
20	Armand Hammer Museum	Museum
21	Westwood Center	Business Center
24	Westwood Presbyterian School	Daycare
36	Carmelite Elder Care Management	Adult Health Care
38	Martyrs Memorial And Museum of the Holocaust	Museum
39	Peter M Khan Memorial Library	Library
40	Petersen Automotive Museum	Museum
41	Los Angeles County Art Museum	Museum
42	German Cultural Center	Cultural
43	Comfort Keepers	Adult Health Care
44	Memorial Branch Los Angeles Public Library	Library
46	Impact Clinical Trials (Adult Daycare)	Adult Health Care
47	Family Home Healthcare	Adult Health Care
48	FS	Fire Station
49	Evergreen Child Care	Daycare
50	Wilshire Adult Day Healthcare	Adult Health Care
53	West Hollywood Branch County of Los Angeles Public	Library
54	West Hollywood Library	Library
57	Beverly Hills Montessori School	Daycare
58	Fountain Day School	Daycare
59	L' Chaim Daycare	Daycare
60	FS	Fire Station
62	West Hollywood Pre-School	Daycare
63	Partners Adult Day Healthcare	Adult Health Care
64	Hollywood Little Red School House	Daycare
Total 36		



**Table 6-25: Alternative 5 - Santa Monica Extension + West Hollywood Extension - Noise and Vibration Sensitive Receivers Within 250 to 500 Feet of Project Alignment**

ID	Name	Category
6	Joslyn Hall	Adult Health Care
7	Miles Memorial Playhouse	Cultural
9	UCLA Medical Center Orthopedic Hospital	Hospital
14	St Johns Hospital Health Center	Hospital
15	Mariner Post-Acute	Adult Health Care
16	Tishman Building	Business Center
27	Fairburn Avenue Elementary School	Elementary School
28	Fairburn PTA Star Program	Daycare
31	Elder Friends Inc.	Adult Health Care
33	Hebrew Academy Nessah	Daycare
34	Nessah Nursery School	Daycare
35	Horace Mann Elementary School	Elementary School
37	Montessori Children's World	Daycare
45	Wilshire United Methodist Church	Church
51	Cedars-Sinai Medical Center	Hospital
52	Mainmonides Academy	Daycare
55	Pacific Design Center	Adult Health Care
56	The Holloway School	Daycare
61	Raya's Paradise	Adult Health Care
65	Hollywood Senior High School	High School
66	Blessed Sacrament School	Private School
Total 21		

**Table 6-26: Alternative 5 - Santa Monica Extension + West Hollywood Extension - Noise and Vibration Sensitive Receivers Within 250 Feet of Proposed Stations**

ID	Name	Category
1	First Presbyterian Nursery	Daycare
2	Delphi Academy of Santa Monica	Daycare
3	Getty Center for the History of Art and the Humanities	Museum
4	Church of Saint Augustine By-The-Sea	Church
5	Nichiren Shoshu of America Temple	Church
8	Santa Monica Hospital Medical	Hospital
18	Gayley Center	Cultural
40	Petersen Automotive Museum	Museum
47	Family Home Healthcare	Adult Health Care
58	Fountain Day School	Daycare
Total 10		



**Table 6-27: Alternative 5 - Santa Monica Extension + West Hollywood Extension - Noise and Vibration Sensitive Receivers Within 250 to 500 Feet of Proposed Stations**

ID	Name	Category
9	UCLA Medical Center Orthopedic Hospital	Hospital
16	Tishman Building	Business Center
17	Unisys Building	Business Center
36	Carmelite Elder Care Management	Adult Health Care
37	Montessori Children's World	Daycare
43	Comfort Keepers	Adult Health Care
65	Hollywood Senior High School	High School
66	Blessed Sacrament School	Private School
Total 8		

**6.3.8 MOS 1 – Fairfax Station Terminus**

Potential noise and vibration sensitive receivers within 250 feet and 500 feet of Alternative MOS 1 have been identified based on GIS land use analysis for the proposed project alignment and station locations. There are a total of 10 identified potential noise and vibration sensitive receptors within 250 feet of the proposed alignment and an additional one potential noise and vibration sensitive receptors within 500 feet of the proposed alignment.

For the proposed stations along Alternative MOS 1, there are x potential noise and vibration sensitive receptors with 250 feet and an additional x potential noise and vibration sensitive receptors with 500 feet.

**6.3.9 MOS 2 – Century City Station Terminus**

Potential noise and vibration sensitive receivers within 250 feet and 500 feet of Alternative MOS 2 have been identified based on GIS land use analysis for the proposed project alignment and station locations. There are a total of 13 identified potential noise and vibration sensitive receptors within 250 feet of the proposed alignment and an additional six potential noise and vibration sensitive receptors within 500 feet of the proposed alignment.

For the proposed stations along Alternative MOS 2, there are x potential noise and vibration sensitive receptors with 250 feet and an additional x potential noise and vibration sensitive receptors with 500 feet.

**6.3.10 Maintenance and Operation Facility Sites**

Based on GIS land use analysis there are no potential noise and vibration sensitive receivers within 500 feet of the Maintenance and Operation Facility Sites.

**6.3.10.1 Vibration Impacts**

Common vibration producing equipment used during station construction activities include, pile drivers, jackhammers, pavement breakers, hoe rams, augur drills, bulldozers and backhoes. Pile driving operations will probably be the activities that produce the highest level of vibration. Perceptible vibration levels could be experienced within 200 feet of pile driving operations.



Equipment used for underground construction, such as a tunnel boring machine and mine trains would generate vibration levels that could result in audible ground-borne noise levels in residential buildings at the surface. The operation of the mine trains would be the major source of underground construction vibration since it will operate continuously during the excavation, mining, and finishing of the tunnel.

Since underground construction is expected to occur continuously over a 24-hour day, there is the potential for these operations, particularly the mine trains, to be audible during the nighttime sleep hours when background noise levels inside the residential buildings are very low.

The most recent transit tunneling project in Los Angeles, the Metro Red Line Project, used a driven-shield TBM for the mining work. A ground vibration study of the mining operations was conducted to estimate construction vibration both from actual excavation of the tunnel and from the trains used to haul mine spoils out of the tunnel. The primary conclusions of the study are:

- Vibration from the tunnel excavation will rarely be a significant problem in adjacent areas, although the vibration can be sufficient to cause several hours of intrusive low level ground-borne vibration at areas above the tunnel.
- Although well below any damage thresholds, vibration from mine trains has the potential of causing intrusive ground-borne noise inside buildings above the tunnel.

### **6.3.11 Significance of Impacts**

The noise and vibration impacts during construction would be adverse (NEPA) and significant (CEQA).

### **6.3.12 Cumulative Impacts**

Cumulative noise and vibration impacts include noise and vibration associated with rerouting traffic, employee vehicle trips, and truck traffic along haul routes in addition to concurrent construction of other projects. At this time, information regarding street closures, rerouting traffic, employee vehicle trips, and haul routes is undetermined. Potential noise and vibration impacts from these activities will be determined as information becomes available.

## **6.4 Utilities**

This section identifies the potential for the project to result in the disruption and/or relocation of utilities that would result in prolonged service disruption. A list of potential utility impacts at station locations is identified in Table 6-28.

It is expected that every major type of utility would be encountered in performing this work. During preconstruction, existing utilities may be more closely inspected and evaluated, including depth, condition, and exact location. An operation called “potholing” is typically done to physically locate certain utilities, which can then be appropriately marked or protected prior to main construction. Where in-place protection is not sufficient, relocation of utilities is required. Utility relocations can be done prior to or during main construction operations, depending on the sensitivity of the utility.



Prior to beginning construction it would be necessary to relocate, modify or protect in place all utilities and below-grade structures which would conflict with excavations for cut-and-cover stations, portals and vent shafts. Subject to other constraints, the below-grade stations would be located to avoid, to the extent possible, major conflicts with the space occupied by below-grade utilities. In certain instances, the positioning of a station or the location of station entrances and vent shafts would require that conflicting utilities be relocated to clear the way for the station structures. Utilities, such as water mains and gas lines, may represent potential hazards during cut-and-cover and open cut station construction. Utilities that are not to be permanently relocated away from the work site would be temporarily rerouted or protected in place to prevent accidental damage to the utilities, to construction personnel, and to the adjoining community. Buried utilities are often protected in place and supported by hanging from deck beams at cut-and-cover sections. Temporary interruptions in services (several hours) may be experienced during relocation or rerouting of utilities.

#### **6.4.1 No Build Alternative**

The No-Build Alternative would maintain the current utility service in the Corridor, and therefore would not impact utilities.

#### **6.4.2 Transportation System Management (TSM) Alternative**

The TSM Alternative would maintain the current utility service in the Corridor, and therefore would not impact utilities.

#### **6.4.3 Alternative 1 – Westwood/UCLA Extension**

##### **6.4.3.1 Electricity, Natural Gas, Steam, Telecommunications, and Cable Television Services**

Dry utilities will be impacted and may require temporary relocation, permanent relocation or protection in place. Impacts will be further validated in subsequent phases of the projects with consideration for early utility relocation evaluated to minimize impacts during the construction phase.

##### **6.4.3.2 Wastewater and Stormwater Collection**

There are potential conflicts identified at four station locations: La Brea, Rodeo Drive, Century City and UCLA that will require resolution by permanent relocation of the impacted storm drains and will be reviewed in more detail in subsequent phases of the project. Consideration for early utility relocation would be evaluated to minimize impacts during the construction of the station box.

#### **6.4.4 Alternative 2 – Westwood/VA Hospital Extension**

##### **6.4.4.1 Electricity, Natural Gas, Steam, Telecommunications, and Cable Television Services**

Dry utilities will be impacted and may require temporary relocation, permanent relocation or protection in place. Impacts will be further validated in subsequent phases of the projects with consideration for early utility relocation evaluated to minimize impacts during the construction phase.

##### **6.4.4.2 Wastewater and Stormwater Collection**

There are potential conflicts identified at four station locations: La Brea, Rodeo Drive, Century City and UCLA that may require resolution by permanent relocation of the impacted storm drains and will be reviewed in more detail in subsequent phases of the



project. Consideration for early utility relocation would be evaluated to minimize impacts during the construction of the station box.

#### **6.4.5 Alternative 3 – Santa Monica Extension**

##### **6.4.5.1 Electricity, Natural Gas, Steam, Telecommunications, and Cable Television Services**

Dry utilities will be impacted and may require temporary relocation, permanent relocation or protection in place. Impacts will be further validated in subsequent phases of the projects with consideration for early utility relocation evaluated to minimize impacts during the construction phase.

##### **6.4.5.2 Wastewater and Stormwater Collection**

There are potential conflicts identified at seven station locations: La Brea, Rodeo Drive, Century City, UCLA, 26<sup>th</sup> Street, 16<sup>th</sup> Street and 4<sup>th</sup> Street that will require resolution by permanent relocation of the impacted storm drains and will be reviewed in more detail in subsequent phases of the project. Consideration for early utility relocation would be evaluated to minimize impacts during the construction of the station box.

#### **6.4.6 Alternative 4 – Westwood/VA Hospital Extension plus West Hollywood Extension**

##### **6.4.6.1 Electricity, Natural Gas, Steam, Telecommunications, and Cable Television Services**

Dry utilities will be impacted and may require temporary relocation, permanent relocation or protection in place. Impacts will be further validated in subsequent phases of the projects with consideration for early utility relocation evaluated to minimize impacts during the construction phase.

##### **6.4.6.2 Wastewater and Stormwater Collection**

There are potential conflicts identified at six station locations: La Brea, Rodeo Drive, Century City, UCLA, Hollywood/Highland and San Monica/San Vicente that will require resolution by permanent relocation of the impacted storm drains and will be reviewed in more detail in subsequent phases of the project. Consideration for early utility relocation would be evaluated to minimize impacts during the construction of the station box.

#### **6.4.7 Alternative 5 – Santa Monica Extension plus West Hollywood Extension**

##### **6.4.7.1 Construction Impacts: Electricity, Natural Gas, Steam, Telecommunications, and Cable Television Services**

Dry utilities will be impacted and may require temporary relocation, permanent relocation or protection in place. Impacts will be further validated in subsequent phases of the projects with consideration for early utility relocation evaluated to minimize impacts during the construction phase.

##### **6.4.7.2 Construction Impacts: Wastewater and Stormwater Collection**

There are potential conflicts identified at nine station locations: La Brea, Rodeo Drive, Century City, UCLA, 26<sup>th</sup> Street, 16<sup>th</sup> Street and 4<sup>th</sup> Street, Hollywood/Highland and San Monica/San Vicente that will require resolution by permanent relocation of the impacted storm drains and will be reviewed in more detail in subsequent phases of the project. Consideration for early utility relocation would be evaluated to minimize impacts during the construction of the station box.

**6.4.8 MOS 1 – Fairfax Station Terminus****6.4.8.1 Electricity, Natural Gas, Steam, Telecommunications, and Cable Television Services**

Dry utilities will be impacted and may require temporary relocation, permanent relocation or protection in place. Impacts will be further validated in subsequent phases of the projects with consideration for early utility relocation evaluated to minimize impacts during the construction phase.

**6.4.8.2 Wastewater and Stormwater Collection**

There are potential conflicts identified at one station location: La Brea that will require resolution by permanent relocation of the impacted storm drains and will be reviewed in more detail in subsequent phases of the project. Consideration for early utility relocation would be evaluated to minimize impacts during the construction of the station box.

**6.4.9 MOS 2 – Century City Station Terminus****6.4.9.1 Electricity, Natural Gas, Steam, Telecommunications, and Cable Television Services**

Dry utilities will be impacted and may require temporary relocation, permanent relocation or protection in place. Impacts will be further validated in subsequent phases of the projects with consideration for early utility relocation evaluated to minimize impacts during the construction phase.

**6.4.9.2 Wastewater and Stormwater Collection**

There are potential conflicts identified at three station locations: La Brea, Rodeo Drive and Century City, that will require resolution by permanent relocation of the impacted storm drains and will be reviewed in more detail in subsequent phases of the project. Consideration for early utility relocation would be evaluated to minimize impacts during the construction of the station box.



Table 6-28: Potential Utility Impacts

Station Location	Sewer	Storm	Water	Gas	Electric	Telephone/Communications
Wilshire/Crenshaw	X					X
Wilshire/La Brea	X	X	X	X	X	X
Wilshire/Fairfax	X		X		X	X
Wilshire/Fairfax - East	X		X			X
Wilshire/La Cienega	X	X				
Connection Structure	X					
Wilshire/La Cienega - West w/ Transfer (Option 3)	X	X				
Wilshire/Rodeo	X	X				
Century City (Santa Monica)	X	X			X	X
Century City (Constellation) (Option 4)	X	X	X		X	X
Westwood/UCLA (Off-Street)		X				
No. 14 Double Crossover						
Westwood/UCLA (On-Street) (Option 5)	X	X		X		X
Westwood/VA Hospital	X	X				
Westwood/VA Hospital – North (Option 6)	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown
Wilshire/Bundy	X					
Wilshire/26th		X	X	X		
Wilshire/16th	X	X	X			
Wilshire/4th	X	X	X			
Hollywood/Highland	X	X				X
Santa Monica/La Brea	X	X				X
Santa Monica/Fairfax	X					X
Santa Monica/San Vicente	X	X				
Beverly Center Area	X	X				

**6.4.10 Maintenance and Operation Facility Sites**

The location of the maintenance sites would be Division 20 Maintenance Yard and Union Pacific Railroad Transportation Center Railroad. Utilities are currently provided for these locations. Therefore no utility relocation or protection would occur. Additional utility service would be needed for the expanded maintenance and operation facilities. No impacts to utilities are expected.

**6.4.11 Significance of Impacts**

The utility impacts during construction would be adverse (NEPA) and significant (CEQA) for all of the Build Alternatives.





### **6.4.12 Cumulative Impacts**

A number of other development projects are currently under construction, in the planning stages, or proposed within the vicinity or adjacent to the proposed project. To minimize potential cumulative impacts associated with these projects, coordination of all projects with the utility service providers is critical to avoid any temporary or prolonged utility service outage. The utility companies and utility customers should consider planning any service upgrades now at the beginning of these urban renewal projects rather than trying to maintain a patch work utility infrastructure until all the proposed projects are completed. If acceptable to the utility providers, Metro will create a third party arbitrator to facilitate resolution of any disagreements between Metro, major utility companies, and city agencies regarding any utility issues. The third party arbitrator would rule on utility issues that would affect the proposed project or other development project within the vicinity or adjacent to the proposed project. With proper planning and scheduling, potential cumulative impacts would be reduced.

### **6.5 Business Disruption Impacts**

This analysis discusses the disruption to businesses that would occur during the construction of the Metro Westside Subway Extension Project. It addresses construction effects on business which would continue to operate within leases of Metro-owned property along the corridor and businesses on adjacent privately owned parcels. Only one portal is currently envisioned for most stations and therefore, station area displacements would be less than shown, depending upon the portal site selection. Construction staging areas would generally be located on the site selected for the future portal.

This analysis is based on construction scenarios and techniques expected to be used for the Westside Subway Extension Project at this time. Further refinements in these business disruption descriptions will occur as the engineering team develops more detail regarding the construction scenarios and techniques that will be used. The business disruption effects addressed in this section would occur only during the construction period, and would therefore be temporary and relatively short-term. The construction scenarios described in Section 4.0 are used to evaluate construction impacts and to identify/propose mitigation measures. Information concerning business locations potentially affected by the project has been obtained from the Real Estate-Acquisitions Technical Report (Metro, 2010) and the Economic and Fiscal Impact Analysis and Mitigation Technical Report (Metro, 2010).

A majority of the Alternatives 1, 2, 3, 4, 5 and MOS 1 and 2 alignments would be constructed underneath existing transportation right-of-ways and are centered along the Wilshire Corridor, a designated transit corridor adopted by the City of Los Angeles General Plan Framework Transportation Element. The primary effects (both direct and indirect) on businesses are likely to be felt immediately adjacent to stations (less than 1/4-mile), diminishing with increasing distance from the station. Potential station area impacts, including, but not limited to, noise and traffic, are addressed individually in the relevant sections that analyze traffic and noise, but they are also summarized below.

- **Traffic and Parking Effects**—Businesses most likely to be affected by project construction would include those that depend on on-street parking or street access, which would be limited during construction. Access, however, will be provided by Metro at all times in some form or proximate location to all businesses. Employees and



contractors requiring parking during construction would use only Metro-owned parcels for parking, thus not interfering with on-street parking for customers of businesses. Bicycle routes and pedestrian access will also be altered periodically throughout the construction period depending on the phase of construction. These changes in circulation patterns are expected to adversely affect businesses in the construction zones for several years during construction particularly as surface construction sequencing activity occurs adjacent to business areas.

- **Noise/Vibration/Dust**—Businesses that are sensitive to noise/vibration/dust may be affected by construction activities. Construction activities that generate noise/vibration/dust include demolition, cut-and-cover excavation and construction, dewatering, slurry treatment, worker travel, hauling of soils and debris for disposal, deliveries of materials, and other related tasks.

### **6.5.1 No Build Alternative**

Under the No Build Alternative there will be no construction activities and therefore no construction-related business disruption impacts.

### **6.5.2 Transportation System Management (TSM) Alternative**

The TSM Alternative requires no construction activities and therefore no construction-related business disruption impacts are anticipated under this alternative.

### **6.5.3 Alternative 1 – Westwood/UCLA Extension**

Under Alternative 1, construction of the rail system would be fully underground and would not introduce any physical barriers that could affect a majority of businesses along the alignments. Construction of stations could require full and partial takes and temporary easements which would require relocations for those businesses. Construction of station portals could temporarily introduce barriers which could alter or hinder business, as discussed below.

Although Alternative 1 would attempt to maximize the public right-of-way for its alignment, stations, and ancillary structures, the following acquisitions and easements are anticipated:

- 40 Full Takes, including commercial business/retail spaces/offices and parking lots
- 5 Partial Takes, 3 commercial business/retail spaces/offices and 2 institutional
- 12 Permanent Easements, including 8 commercial business/retail spaces/offices
- 2 Temporary Construction Easements, 0 in commercial areas
- 218 Permanent Underground Easements, including numerous businesses that would not be affected by construction activities due to the depth of tunneling.

The acquisition of parcels for construction of the project would result in the displacement businesses. Each business displaced as a result of the proposed project would be given advance written notice and would be informed of their eligibility for relocation assistance and payments. Partial takes would not displace businesses. In addition, approximately 365 parking spaces would be removed from the UCLA property during construction which could indirectly hinder access to businesses in that area.



Regarding the loss of parking, typically, privately-operated parking lots are considered transitional land uses that could be developed by the owners for higher and better uses. Additionally, there are several other privately-operated parking lots and structures in the vicinity which could be used by the public for access to nearby businesses. Although loss of the current parking lot may cause a temporary inconvenience for customers, it would not represent a long-term adverse impact. This potential impact to parking would be partially offset by the increased public transit access provided by the proposed project in the long-term. No adverse impacts are anticipated due to the partial displacement of this parcel.

**Table 6-29: Westwood/UCLA Extension Full Takes**

APN	Address	Jurisdiction	Current Use	Intended Use
5093005006	3818 Wilshire Blvd	Los Angeles	Bridal Salon Retail Space	Construction Staging
5093005005	3820 Wilshire Blvd	Los Angeles	Elite Tailors Retail Space	Construction Staging
5093005004	3828 Wilshire Blvd	Los Angeles	Restaurant (Young Dong)	Construction Staging
5093005003	3832 Wilshire Blvd	Los Angeles	ECC Academy Retail Space	Construction Staging
5093005002	3846 Wilshire Blvd	Los Angeles	Wilshire State Bank Bldg Retail Spaces	Construction Staging
5093005009	3835 Ingraham St	Los Angeles	Residential Parking For Mercury Apartments	Construction Staging
5093005010	3841 Ingraham St	Los Angeles	Parking Lot Behind Wilshire Bank Bldg	Construction Staging
5093005011	3847 Ingraham St	Los Angeles	Parking Lot Behind Wilshire Bank Bldg	Construction Staging
5090032900	N/A	Los Angeles	Metro-Owned Vacant Lot/Parking	Potential Entrance/Construction Staging
5090032005	675 Crenshaw Blvd	Los Angeles	Single-Family Residence	Entrance/Construction Staging
5507024010	5200 Wilshire Blvd	Los Angeles	Empty Lot Corner Of La Brea/Wilshire	Entrance
5507024009	5220 Wilshire Blvd	Los Angeles	Empty Lot Corner Of La Brea/Wilshire	Entrance
5089001027	711 S La Brea Ave	Los Angeles	Bank of America	Entrance/Construction Staging
5089001026	5318 Wilshire Blvd	Los Angeles	Retail Space	Entrance/Construction Staging
5089001025	729 S La Brea Ave	Los Angeles	Bank Parking	Construction Staging
5089001009	718 S Detroit St	Los Angeles	Parking Lot	Construction Staging
5089001008	722 S Detroit St	Los Angeles	Parking Lot	Construction Staging
5089001007	726 S Detroit St	Los Angeles	Parking Lot	Construction Staging
5086010004	6000 Wilshire Blvd	Los Angeles	Parking Lot For Retail Space	Construction Staging
5086010003	6010 Wilshire Blvd	Los Angeles	Retail Space	Construction Staging
5086010002	6018 Wilshire Blvd	Los Angeles	Retail Space Art Gallery	Construction Staging
5086010001	6030 Wilshire Blvd	Los Angeles	Retail Space Art Gallery	Construction Staging
5510027003	6111 Wilshire Blvd	Los Angeles	Marinello's Beauty School	Entrance

APN	Address	Jurisdiction	Current Use	Intended Use
5510027040	6121 Wilshire Blvd	Los Angeles	99 Cent Store	Staging
5510027005	6133 Wilshire Blvd	Los Angeles	Offices	Staging
5510027006	6139 Wilshire Blvd	Los Angeles	Parking For Offices	Staging
5510027038	6155 Wilshire Blvd	Los Angeles	Commercial	Generator & Staging
5088002034	6120 Wilshire Blvd	Los Angeles	Commercial	Entrance & Staging
5088002035	6122 Wilshire Blvd	Los Angeles	Residential/Commercial	Entrance & Staging
5088002036	N/A	Los Angeles	Commercial	Entrance & Staging
5088002037	6130 Wilshire Blvd	Los Angeles	Commercial	Entrance & Staging
5088002038	6146 Wilshire Blvd	Los Angeles	Commercial	Entrance & Staging
4333029015	8400 Wilshire Blvd	Beverly Hills	Restaurant	Construction Staging/Generator
4333029016	8412 Wilshire Blvd	Beverly Hills	Parking Lot For Medical Group Company	Construction Staging/Generator
4333029017	8420 Wilshire Blvd	Beverly Hills	Medical Bldg	Construction Staging
4333029014	N/A	Beverly Hills	Parking Lot For Businesses	Construction Staging/Generator
4334021059	8471 Wilshire Blvd	Beverly Hills	Citibank	Entrance/Construction Staging
4334008021	8755 Wilshire Blvd	Beverly Hills	Under Construction	Connection Structure
4334008020	8767 Wilshire Blvd	Beverly Hills	Under Construction	Connection Structure
4331001045	9430 Wilshire Blvd	Beverly Hills	Ace BH Art Gallery	Entrance/Construction Staging

To construct Alternative 1 – Westwood/UCLA Extension, two parcels would be acquired partially (Table 6-30). In addition, approximately 365 parking spaces would be removed from the UCLA property.

**Table 6-30: Westwood/UCLA Extension Partial Takes**

APN	Address	Jurisdiction	Current Use	Intended Use
5508007900	5301 Wilshire Blvd	Los Angeles	Property owned by LACMTA	Potential Entrance/ Construction Staging
4328033001	9460 Wilshire Blvd	Beverly Hills	Union Bank Building	Potential Entrance/ Construction Staging
4363026905	1100 Veteran Ave	Los Angeles	UCLA Property	Potential Entrance/ Construction Staging/ Generator
4324002027	10990 Wilshire Blvd	Los Angeles	Offices	Potential Entrance
4365008904	N/A	Los Angeles	VA Hospital	Station Envelope/Potential Entrance/Vent Shaft/Generator

Source: TAHA, 2010



To construct Alternative 1 – Westwood/UCLA Extension, permanent easements would be required from ten parcels (Table 6-30). Under Alternative 1, permanent easements would be required for station entrances, staging, and placement of generators on these parcels. The exact locations of the station entrances have not been determined, but they would not disrupt operations of the businesses or uses at these parcels.

**Table 6-31: Westwood/UCLA Extension: Permanent Easements**

APN	Address	Jurisdiction	Current Use	Intended Use
5508017007	6067 Wilshire Blvd	Los Angeles	LACMA	Potential Entrance
5510027035	6101 Wilshire Blvd	Los Angeles	Johnie’s Coffee Shop	Potential Entrance
4334021060	8447 Wilshire Blvd	Beverly Hills	Offices	Potential Entrance
4333028015	8484 Wilshire Blvd	Beverly Hills	Flynt Publications	Potential Entrance
4343013028	9401 Wilshire Blvd	Beverly Hills	Citibank	Potential Entrance
4343013011	9429 Wilshire Blvd	Beverly Hills	Citibank/Sterling Bldg.	Potential Entrance
4343014022	9461 Wilshire Blvd	Beverly Hills	Bank of America Plaza	Potential Entrance
4343014023	9461 Wilshire Blvd	Beverly Hills	Offices	Potential Entrance
4343014024	9461 Wilshire Blvd	Beverly Hills	Offices	Potential Entrance
4343014025	9461 Wilshire Blvd	Beverly Hills	Offices	Potential Entrance
4319002046	1800 Avenue Of The Stars	Los Angeles	Plaza	Potential Entrance
4319003061	1801 Avenue Of The Stars	Los Angeles	Plaza	Potential Entrance

Source: TAHA, 2010

To construct Alternative 1 – Westwood/UCLA Extension, temporary construction easements would be required for two parcels (Table 6-31).

**Table 6-32: Westwood/UCLA Extension: Temporary Construction Easements**

APN	Address	Jurisdiction	Current Use	Intended Use
4324017903	11000 Wilshire Boulevard	Los Angeles	Federal Building	Cut & Cover
4365008904	11300 Wilshire Boulevard	Los Angeles	VA Hospital	Cut & Cover

Source: TAHA, 2010

Two (2) temporary construction easements would be involved and 217 parcels would possibly be subject to noise/vibration during underground tunneling construction activities, although due to the depth of tunneling impacts are not expected to be major.

- APN 4324017903 (11000 Wilshire Boulevard, Los Angeles; Figure 5-10 # 124) – This Federal Building parcel is not commercially occupied, but it is discussed here because it is currently occupied with federal offices. Part of the parcel is anticipated to be utilized for the cut and cover construction of the crossover tracks. Although no part of the building is anticipated to be impacted, part of the landscaped plaza would be disturbed and have restricted access during construction. However, access to the building would be maintained, as would security around the building. This easement would be temporary, and the site would be returned to pre-construction conditions once



construction is completed. No adverse impacts are anticipated due to this temporary construction easement.

- APN 4365008904 (11300 Wilshire Boulevard, Los Angeles County; Figure 5-10 # 125) – This parcel is currently occupied by the Los Angeles County Veterans Administration (VA) Hospital and grounds, while not a commercial property is discussed here because of its dependence on customers (patients). Part of the parcel is anticipated to be utilized for the cut and cover construction of the pocket tracks and potentially an access point for the Tunnel Boring Machines (TBMs). Although no part of the building is anticipated to be impacted, part of the landscaped area and parking lot would be disturbed and have restricted access during construction. However, access to the building would be maintained. This easement would be temporary, and the site would be returned to pre-construction conditions once construction is completed. No adverse impacts are anticipated due to this temporary construction easement.

Prior to construction activities, community relations and construction staff from Metro would contact and interview individual businesses, allowing for knowledge and understanding of how these businesses carry out their work. This survey identifies business usage, delivery, and shipping patterns and critical times of the day or year for business activities. This information will be used by Metro to develop construction requirements and Worksite Traffic Control plans, identify alternative access routes, and make efforts during construction to maintain critical business activities.

The following construction activities could temporarily disrupt business activity near stations:

- **Construction Staging Areas:** Temporary easements, typically a portion of the sidewalk, traffic lanes, and/or parking areas would be required at various locations for construction staging. Construction within the streets is also envisioned where no off-street areas can be identified for work-sites and/or access to underground excavations, which could temporarily impact access to businesses.
- **Building Demolition:** As part of providing the land needed for construction, or preparing the necessary work areas, building demolition is often required. Demolition operations necessitate strict controls to ensure that adjacent buildings and infrastructure are not damaged or otherwise impacted by the demolition operations. These controls include construction fencing and barricades, environmental monitoring, and limits on the types of equipment and demolition procedures, which could temporarily impact access to businesses. Noise, vibration, and dust related to building demolition could also impact local businesses.
- **Utility Relocation and Street Closures:** Prior to construction it would be necessary to relocate, modify or protect in place all utilities and underground structures that would conflict with excavations. During this time, it may be necessary to occupy additional traffic lanes at one time. It is possible that in some instances, block-long sections of streets would be closed temporarily for utility relocation and related construction operations, which could temporarily impact access to businesses. Pedestrian access (sidewalks) would remain open. Temporary night sidewalk closures may be necessary in some locations for the delivery of oversized materials. Special facilities, such as handrails, fences, and walkways will be provided for the safety of pedestrians.





Minor cross streets and alleyways may also be temporarily closed but access to adjacent properties will be maintained. Major cross streets would require partial closure, half of the street at a time, while relocating utilities. Subject to other constraints, the underground stations have been located to avoid to the extent possible conflicts with the space occupied by utilities. Utilities, such as high-pressure water mains and gas lines, which could represent a potential hazard during cut-and-cover and open-cut station construction and that are not to be permanently relocated away from the work site, would be removed from the cut-and-cover or open-cut area temporarily to prevent accidental damage to the utilities, to construction personnel and to the adjoining community including businesses. These utilities would be relocated temporarily by the contractor at the early stages of the operations and reset in essentially their original locations during the final backfilling above the constructed station.

Utilities that need not be relocated, either permanently or temporarily, but that may be uncovered during the early stages of excavation, may require special provisions to provide access to businesses. These buried utilities, with the possible exception of sewers, are generally found within several feet of the street surface. They can be reinforced, if necessary, and supported by hanging from deck beams.

Utility relocations often entail some form of temporary service interruptions, which are typically limited to short periods during the cut-over from the existing to the relocated service. Such service interruptions are typically planned to occur at periods of minimum use (such as nights or weekends for businesses), so that outages have the least impact on users. In the event that utility relocation causes a service interruption, businesses could be impacted as they would be without these essential services.

In addition to utility relocations, various new utilities will be installed as required. These new installations can be expected to include communications cables (including fiber-optic lines), electrical duct-banks, drainage facilities (pipelines, catch basins, etc.), water supply lines, and lighting. These installations will generally be timed to coincide with major utility relocations where possible to minimize disruption to utility users, including businesses.

- **Stations:** Within the Wilshire/Western to Wilshire/Fairfax reach, there are two or three new stations to construct: Wilshire/Crenshaw, Wilshire/La Brea, and Wilshire/Fairfax. Wilshire/Crenshaw remains as an optional station at this time). Depending upon site constraints a station deck and support of excavation may be installed several lanes at a time or possibly through full road closures over extended weekends. Removal of decking after construction of the station and tunnels will be similarly staged. Takes and easements for local property (including businesses) would be required to construct stations. Temporary business closures to adjacent areas would be minimized to maintain access to businesses that are not directly affected.
- **Contractor Work and Storage Areas:** The on-street Wilshire/Fairfax Station excavation would be the first item of construction after demolition of existing buildings designated to be removed. Two TBMs could be assembled at the Wilshire/Fairfax Station construction staging area, located between South Crescent Heights Boulevard and Fairfax Avenue to the north side of Wilshire Boulevard. Utilities, air, water, disposal, electricity, sanitation, and communication equipment could be positioned near the east



end of the construction yard. Use of these working areas and yards would minimize adverse effects on businesses in the Wilshire/Fairfax station area.

- **Station Excavation and Construction:** Station Excavation and Construction could potentially impact access to businesses through increased traffic, dust, and noise and vibration. A typical station excavation would occur over an approximately 18-month period. The total sequences described for underground station construction could be up to 48 months. It is estimated that an average of 25 to 50 dump trucks per day would be required to haul and dispose of the excavated soils during excavation cycles for stations, which could cause increased traffic in the areas of station excavation.
- **Excavation Support:** If the pre-construction building assessments indicate the necessity to protect nearby existing structures, the first step in construction of an underground station is to support the foundations of buildings adjacent to the station excavation. This is typically done by underpinning, which involves the placement of additional foundation elements under the building to support the structure well below the area to be excavated. Alternatively, the ground below the existing foundations can be improved by other means such as grouting. In lieu of underpinning or grouting, or in combination with grouting, the support of adjacent structures is commonly accomplished by use of more rigid excavation support systems, which could temporarily impact use of access to underground structures by some businesses.
- **Dewatering:** Dewatering is likely to be required at the underground station sites to temporarily lower the groundwater level (if present) below the station excavation depth or to an impermeable soil layer. Installation of dewatering wells using drilling rigs could disrupt businesses.
- **Settlement:** Underground excavation for stations using the cut-and-cover technique can result in some ground relaxation and deformation of the retained soils. Buildings within the zone potentially susceptible to ground movement will be evaluated for susceptibility to settlement and the need for additional protection measures. Typical building protection measures are discussed Geotechnical and Hazardous Materials Technical Report (Metro, August 2010).
- **Traffic:** Businesses depend on access to customers. Traffic flow can be affected during the entire period of construction of at any given location, which is typically anticipated to be approximately 4-5 years. Depending on the traffic flow and location, a variety of mechanisms are available to control and maintain traffic in constricted intersections, including decking to temporarily replace street pavement and sidewalks, and temporary bridges. Decking will typically contain hatches or removable panels to facilitate lowering equipment or materials (such as odd-shaped and outsize items) down into the station excavation with minimal traffic disruption.

Cross streets, if used, will typically be carried through intersections on similar decked structures. Pedestrian access (sidewalks) would remain open, although in some instances, portions of the sidewalks may be closed temporarily for decking construction. Where sidewalks must be temporarily removed, pedestrian access will be maintained by bridges, temporary walkways, and other means. Some streets may also have to be temporarily closed under certain special circumstances, such as deck beam installation, which could impact access to businesses.





- **Tunnel Settlement Protection Measures:** Structures (including businesses) located within settlement/deformation zones would be evaluated for potential impact and required mitigation measures. For shallow tunnels below sensitive structures or utilities, additional methods can be employed to reduce settlement. Such methods would depend on the ground conditions and structure details at specific areas.
- **Excavated Materials (Spoil) Removal:** During a subsequent phase of the project, suitable soil disposal sites will be identified to ensure the excavated material can be removed and transported to the disposal area in a timely and efficient operation. [Reference to haul routes to be inserted] Environmental concerns are often encountered at the site areas where spoils are transported from the underground work locations to the ground surface and then loaded into trucks. These are typically work zones subject to noise and dust control restrictions. Noise and/or dust walls are sometime required to mitigate these concerns.

Alternative 1 would displace businesses that involve 302 jobs. The acquisition of parcels would result in loss of \$1,896,885 property tax revenue dollars.

#### **6.5.4 Alternative 2 – Westwood/VA Hospital Extension**

This alternative would follow the same alignment as Alternative 1 – Westwood/UCLA Extension but would include one additional parcel at the VA Hospital.

To construct Alternative 2, impacts resulting from full takes, permanent easements, construction easements, and sub-surface permanent easements on parcels would be the same as under Alternative 1. Construction staging would occur near the VA Hospital. Under Option 6, the potential construction staging site is located in the parking lot on the north side of the station box near Wadsworth Theater.

Impacts from the construction phase for Alternative 2 would be the same as the described above for Alternative 1. In addition, if the Westwood/VA Hospital site is the terminus of choice, the site could be used as a TBM entry station, with mining proceeding east to the Century City Station. Since the Westwood/VA Hospital Station is located on VA property, station excavation could remain open, without the need for temporary decking. No street closures would be necessary. The VA site may require (partial) closure of Bonsall Avenue, the eastbound Bonsall/Wilshire on-ramp, and/or the 405 on and off ramps adjacent to the site. Further traffic control would only be needed for entering and exiting of construction traffic onto adjacent roadways, which could temporarily impact access to businesses.

Business disruption from Alternative 2 would cause the loss of 302 jobs. The acquisition of parcels would result in loss of \$1,896,885 property tax revenue dollars.

#### **6.5.5 Alternative 3 – Santa Monica Extension**

Although Alternative 3 would attempt to maximize the public right-of-way for its alignment, stations, and accessory structures, the following types and amounts of displacements are anticipated:

- 59 Full Takes, including approximately more than 17 businesses and 2 parking lots in addition to those described under Alternatives 1 and 2
- 5 Partial Takes, same as Alternatives 1 and 2



- 13 Permanent Easements, same as Alternatives 1 and 2 plus one additional easement for Alternative 3
- 2 Temporary Construction Easement, same as Alternatives 1 and 2
- 219 Permanent Underground Easements, same as Alternatives 1 and 2

These parcels would be utilized for construction staging, below grade tunneling, station locations, generator locations, and vent locations. Some station plans have multiple entrance options, though not all of them would be constructed. In these cases, all potential takings and easements for station entrances are evaluated.

**Table 6-33: Alternative 3 – Santa Monica Extension: Additional Full Takes (Not in Alternatives 1 or 2)**

APN	Address	Jurisdiction	Current Use	Intended Use
4265016050	N/A	Los Angeles	Ralph's Grocery Store	Potential Entrance/Construction Staging
4265016030	12071 Wilshire Blvd	Los Angeles	Small Businesses Nail/Barber/Tailor/Shoe Repair	Potential Entrance/Construction Staging
4265016029	12081 Wilshire Blvd	Los Angeles	Restaurant	Potential Entrance/Construction Staging
4263003003	12036 Wilshire Blvd	Los Angeles	Wireless Electronics Store	Potential Entrance/Construction Staging
4263003002	12040 Wilshire Blvd	Los Angeles	Storage Tanks	Potential Entrance/Construction Staging
4263003001	12048 Wilshire Blvd	Los Angeles	Storage Tanks	Potential Entrance/Construction Staging
4263003271	12054 Wilshire Blvd	Los Angeles	Storage Tanks	Potential Entrance/Construction Staging
4266016054	2601 Wilshire Blvd	Santa Monica	Gas Station	Potential Entrance
4276001027	2525 Wilshire Blvd	Santa Monica	Several Small Businesses (Relax The Back, Starbucks, Postal, Tanning)	Potential Entrance/Construction Staging/Generator
4276001025	2515 Wilshire Blvd	Santa Monica	Non-Profit (Environment Now)	Potential Entrance/Construction Staging/Generator
4276001026	2501 Wilshire Blvd	Santa Monica	Several Shops (Shoe Repair, Nail Salon, Clothing Store, Jewelry, Tennis Shop, Scuba Shop) and Tennis Courts on Roof	Potential Entrance/Construction Staging
4281005026	1501 Wilshire Blvd	Santa Monica	Electronics Store	Construction Staging
4281005025	1511 Wilshire Blvd	Santa Monica	Mattress Store	Construction Staging
4281011010	Wilshire Blvd and 15th Street	Santa Monica	Parking Lot	Construction Staging
4281011011	1433 Wilshire Blvd	Santa Monica	Izzy's Deli	Potential Entrance/Construction Staging



APN	Address	Jurisdiction	Current Use	Intended Use
4281011012	1423 Wilshire Blvd	Santa Monica	Mattress Store	Potential Entrance/ Construction Staging
4281011025	1419 Wilshire Blvd	Santa Monica	Cleaners/Tehran Market	Potential Entrance/ Construction Staging
4291004015	412 Wilshire Blvd	Santa Monica	Jewelry/Bank	Potential Entrance/ Construction Staging
4291004014	1207 4th St	Santa Monica	Offices	Potential Entrance/ Construction Staging

Source: TAHA, 2010

Alternative 3 requires additional full acquisitions under Alternative 1 and 2 (

Table 6-33). Each business displaced would be given advance written notice and would be informed of their eligibility for relocation assistance and payments. Where relocation of a particular business would be required, it is anticipated that most of the jobs associated with the business would be relocated as well. Therefore, there would be no net loss of jobs. No adverse impacts associated with this displacement are anticipated.

To construct Alternative 3, the partial acquisitions and temporary construction easement under Alternatives 1 and 2 would be the same for Alternative 3; therefore impacts would be the same as under Alternatives 1 and 2. As described previously, no structures on these parcels would be displaced or relocated as a result of these permanent underground easements.

One additional permanent easement on commercial property is anticipated under Alternative 3 in addition to those under Alternative 1 and 2. These permanent easements would be required to accommodate station entrances. The exact locations of the station entrances have not been determined, but they would not disrupt operations of the businesses or uses in these parcels. The owners and tenants of the parcels would be given advance written notice and would be informed of their eligibility for payments for use of their space for the station entrances. No adverse impacts are anticipated due to these permanent easements.

**Table 6-34: Alternative 3 – Santa Monica Extension: Additional Permanent Easement (Not in Alternatives 1 or 2)**

APN	Address	Jurisdiction	Current Use	Intended Use
4292013029	401 Wilshire Boulevard	Santa Monica	Offices	Potential Entrance

Source: TAHA, 2010

- **Construction Scenario:** Indirect impacts from the construction phase for Alternative 2 parallels the description described above for Alternative 1.
- **Construction Schedule:** Construction of the Santa Monica Extension is expected to take approximately 5-½ years. Businesses in the area of station locations could expect to experience direct or indirect impacts during this time.

Alternative 3 would displace businesses that involve the loss of 413 jobs. The acquisition of parcels would result in loss of \$2,399,775 property tax revenue dollars.

**6.5.6 Alternative 4 – Westwood/VA Hospital Extension plus West Hollywood Extension**

Alternative 4 would follow the same alignment and have the same stations as Alternative 1 – Westwood/UCLA Extension. In addition, this alternative includes the West Hollywood Extension, which extends from the existing Metro Red Line Hollywood/Highland Station. From a new station in this location, this alignment extends southerly, centered under Highland Avenue, and continues south under Highland Avenue to just north of Lexington Avenue where it curves to Santa Monica Boulevard. The alignment continues westerly under the center of Santa Monica Boulevard until just east of the Santa Monica/San Vicente Boulevard intersection where the alignment curves south and is centered under San Vicente Boulevard. From San Vicente Boulevard, the alignment curves south and then southwesterly to cross under La Cienega Boulevard to the Wilshire/La Cienega Station.

Although Alternative 4 would attempt to maximize the public right-of-way for its alignment, stations, and accessory structures, the following acquisitions and easements are anticipated:

- 64 Full Takes, including approximately 16 businesses/business areas and 8 parking lots in addition to those described in Alternative 1.
- 6 Partial Takes, the same as Alternative 1.
- 16 Permanent Easements, including approximately 3 businesses and 1 parking lot in addition to those described in Alternative 1.
- 3 Temporary Construction Easements, the same as Alternative 1 plus one additional easement.
- 328 Permanent Underground Easements.

These parcels would be utilized for construction staging, below grade tunneling, station locations, generator locations, and vent locations. Some station plans have multiple entrance options, though not all of them would be constructed. In these cases, all potential takings and easements for station entrances are evaluated.

Each business displaced as a result of the proposed project would be given advance written notice and would be informed of their eligibility for relocation assistance and payments. It is anticipated that where relocation would be required, it would result in the relocation of most of the jobs that would be potentially displaced. Therefore, there would be no net loss of jobs overall. No adverse impacts associated with this displacement are anticipated.

One additional parcel that would be partially acquired (APN 4337017903) has not been identified under Alternatives 1 through 3.

- APN 4337017903 (8800 Santa Monica Boulevard, West Hollywood; Figure 5-19 #37) – This parcel is currently occupied by the Metro Division 7 Maintenance Yard and Offices. Construction of the Alternative 4 – Westwood/VA Hospital Extension plus West Hollywood Extension is anticipated to take part of the parcel for the station entrance and for construction staging. Although no part of the building is anticipated to be impacted, part of the parking lot would be utilized. Access to the building and the maintenance yard would be maintained. This parcel is currently owned by Metro. No adverse impacts are anticipated due to the partial displacement of this parcel.



Permanent easements would be required to accommodate station entrances on 16 parcels. The exact locations of the station entrances have not been determined, but they would not disrupt operations of the businesses or uses in these parcels. The owners and tenants of the parcels would be given advance written notice and would be informed of their eligibility for payments for use of their space for the station entrances. No adverse impacts are anticipated due to these permanent easements.

To construct Alternative 4, temporary construction easements would be required for two parcels. One of these parcels was identified as a temporary construction easement under Alternative 1. For the section, construction of Alternative 4 is anticipated to utilize portions of the Metro Division 7 Maintenance Yard parcel for construction staging. Although no part of the building is anticipated to be impacted, part of the parking lot would be utilized for equipment and material storage. Access to the building and the maintenance yard would be maintained. This parcel is currently owned by Metro. No adverse impacts to other businesses are anticipated due to this temporary construction easement.

Alternative 4 would displace businesses that involve the loss of 363 jobs. The full acquisition of parcels would result in loss of \$2,438,395 property tax revenue dollars.

**Table 6-35: Alternative 4 – Westwood/VA Hospital Extension plus West Hollywood Extension: Additional Permanent Easements (Not in Alternatives 1 or 2)**

APN	Address	Jurisdiction	Current Use	Intended Use
5531017020	7118 Santa Monica Boulevard	West Hollywood	Vacant	Potential Entrance
5530014001	7780 Santa Monica Boulevard	West Hollywood	Car Leasing Parking Lot	Potential Entrance
4334006019	8575 W 3rd Street	Los Angeles	Parking Lot	Potential Entrance
4334007008	121 N La Cienega Boulevard	Los Angeles	Commercial	Potential Entrance

- **Construction Scenario:** This alternative would have the same general construction techniques as described under Alternative 2 for the alignment between Wilshire/Western and Westwood/VA Hospital Extension. Impacts to businesses resulting from post construction, tunnel construction, underground utilities, stations, street/site restorations, vent shafts and emergency exits will be essentially the same as described in Alternative 1; there are no recognized differences.
- **Estimated Volume of Excavated Materials from Tunnel Construction:** The total volume of excavated materials for the tunnel excavation from Wilshire/La Cienega to Hollywood/Highland is estimated to be approximately 330,000 CY. Based on this volume and the anticipated sequence of construction, the truck counts for tunnel spoil removal is estimated to be from 40-80 daily truck trips, which could temporarily impact an increased amount of businesses due to additional traffic.

**6.5.7 Alternative 5 – Santa Monica Extension plus West Hollywood Extension**

Although Alternative 5 would attempt to maximize the public right-of-way for its alignment, stations, and accessory structures, the following acquisitions and easements are anticipated:

- 83 Full Takes, including 18 commercial business/retail spaces/offices and 11 parking lots under ; approximately more than 20 businesses and 2 parking lots under



Alternative 2; and approximately 15 businesses/business areas and 8 parking lots under Alternative 4.

- 6 Partial Takes, including 0 commercial business/retail spaces/offices and 1 parking lot under ;
- 17 Permanent Easements, including 8 commercial business/retail spaces/offices under ; two additional easements for Alternative 3; and easements for 2 businesses and 1 parking lot under Alternative 4.
- 3 Temporary Construction Easements, including 0 in commercial areas under ;
- 328 Permanent Underground Easements, including numerous businesses that would not be affected by construction activities due to the depth of tunneling under Alternatives 1 and 4.

Alternative 5 would displace businesses that involve the loss of 474 jobs. The full acquisition of parcels would result in loss of \$2,941,285 property tax revenue dollars.

- **Construction Scenario:** Alternative 5 adds the West Hollywood Extension to the work described under Alternative 3. This scenario involves the entire sum total of all work mentioned above. It is the complete system. The construction methods and expected scenarios are not greatly different in Alternative 5 than as described in Alternatives 1 through 5.
- **Construction Schedule:** The duration of construction for all segments could take approximately 7-½ years if all work is concurrently scheduled and executed; however it is unlikely that the existing roadways and infrastructure can accommodate so many different construction operations at the same time. In addition, the accumulated impacts on the community including local businesses would be adverse. It is more probable to expect that one or more of the Segment 1, 2, and 3 reaches would be substantially completed before a next reach can begin. If only a minimum of overlap between the segments is assumed, with appropriate geographical separation, it can be expected that the total construction period could be extended to as much as 20 years. If overall scenarios in which the work is realistically optimized through an aggressive design and construction program, the total construction period that local businesses would endure could be reduced to approximately 10 to 16 years.

### 6.5.8 MOS 1 – Fairfax Station Terminus

The Minimum Operable Segment (MOS 1) – Fairfax Extension Alternative would follow the same alignment as Alternative 1 and terminate at the Wilshire/Fairfax station.

The MOS would follow the same alignment as Alternative 1 and terminate at the Wilshire/Fairfax station. The following acquisitions and easements are anticipated for MOS 1:

- 32 Full Takes
- 1 Partial Take
- 2 Permanent Easements



No temporary construction easements or permanent underground easements are anticipated under the MOS 1 – Wilshire Extension.

No temporary construction easements or permanent underground easements are anticipated under MOS 1. MOS 1 would displace businesses that involve the loss of 216 jobs. The acquisition of parcels would result in loss of \$648,021 property tax revenue dollars.

To construct the MOS 1, 27 parcels would be fully acquired. These parcels were identified as full takes under Alternative 1. One parcel would be partially acquired (APN 5508007900). This parcel was already identified as a partial take under Alternative 1. Permanent easements would be required for two parcels for the construction of the Wilshire/Fairfax station (APNs 5508017007 and 5510027035). These parcels were identified as permanent easements under MOS 2 – Century City Station Terminus.

Construction of MOS 1 is the same as Segment 1 of Alternative 1 and is assumed to be the first item of work to be done. Should this be the only work performed, the station at Wilshire/Fairfax would become the terminus and would likely include a crossover and/or rail tracks.

The construction scenario and Schedule and would have the same impacts as Alternative 1.

#### **6.5.9 MOS 2 – Century City Station Terminus**

The MOS 2 – Century City Extension would follow the same alignment as and have all but one of the stations of Alternative 1. The MOS 2 – Century City Extension would follow the same alignment as and have all but one of the stations of Alternative 1.

The following acquisitions and easements are anticipated to construct MOS 2:

- 40 Full Takes
- 2 Partial Take
- 12 Permanent Easements
- 4 Permanent Underground Easements

MOS 2 would displace businesses that involve the loss of 280 jobs. The acquisition of parcels would result in loss of \$1,073,932 property tax revenue dollars.

To construct the MOS 2 – Century City Extension, 40 parcels would be fully acquired. These parcels were identified as full takes under Alternative 1. Two parcels would be partially acquired. Ten parcels would require permanent easements for the construction of the Wilshire/Fairfax station. Permanent underground easements would be required for four parcels (APNs 4319003902, 4328001001, 4328001023, 4328001024). All of these parcels were identified as permanent underground easements under Alternative 1.

The construction scenario and Schedule and would have the same impacts as Alternative 1.

#### **6.5.10 Maintenance and Operation Facility Sites**

The Westside Subway Extension Project would require either the expansion of Metro Division 20 Rail Yard or the construction of a new rail yard to house and maintain the rail





cars. The expansion of Metro Division 20 Rail Yard would involve four full takes of vacant land and eight partial acquisitions in the rail yard area, which would be a property tax revenue loss of \$1,892,645. For the Union Pacific rail yard, two full takes, three partial takes, 13 permanent easements, and three temporary construction easements would be required for this rail yard option. This would result in a property tax revenue loss of \$2,890,941. No residences would be impacted for the construction of either of the maintenance and operation facility sites.

Development of maintenance facilities will include the construction of storage tracks, shop buildings, and associated wayside structures, such as vehicle cleaning facilities, electrical substations and employee facilities. Generally, the structures would be low-rise, from two to three stories in height (maximum), with parking provided at areas physically separated from the trackways.

Construction of these facilities would entail some demolition, site clearing and grading. Shallow excavations and/or pile installations would be required for structure foundations. Trenching and excavation would also be required for utilities and rail systems installations.

#### **6.5.11 Significance of Impacts**

The business disruption impacts during construction would be adverse (NEPA) and significant (CEQA).

#### **6.5.12 Cumulative Impacts**

Business disruptions and displacements are site-specific in nature and would not contribute cumulatively to other displacement in the project area. Therefore, no cumulative adverse impacts associated with displacement and relocation are anticipated.

### **6.6 Relationship Between Local Short-Term Use of Resources and Maintenance and Enhancement of Long-Term Productivity**

This section describes the relationship between local short term use of resource and maintenance and enhancement of long-term productivity as related to construction impacts.

#### **6.6.1 No Build and Transportation System Management (TSM) Alternatives**

The No Build and TSM Alternatives would not require short-term use of resources, since no construction would occur.

#### **6.6.2 Alternatives 1, 2, 3, 4, and 5; MOS 1 and 2; and Maintenance Yards**

For these alternatives, the Westside Subway Extension Project would result in temporary construction-related increases in noise, traffic congestion and delays, and air pollutants. Construction of stations could require the loss of historic structures.

These and other short-term environmental impacts (i.e., "uses" of the environment) would be balanced by achieving an improved transit system for the Los Angeles metropolitan area. Maintaining an expanded transit system would permit a more efficient movement of people and would enhance long-term productivity.

Irreversible and Irretrievable Commitment of Resources





This section describes the irreversible and irretrievable resources that would be used by construction of the build alternatives. The No-Build and Transportation System Management alternatives would not involve the use of construction resources.

The build alternatives would involve the commitment of a range of natural, physical, human, and fiscal resources. The build alternatives would require space to construct the Westside Subway Extension stations. The build alternatives would also require right-of-way on several areas along the alignment stations and portals. The land used for the proposed project is considered an irreversible commitment during the time period that the land is used for a transportation facility.

Considerable amounts of fossil fuels, labor, and construction materials (such as cement, aggregate, and steel) would be expended. Workers are expected to be drawn from the regional labor pool, with specialty trades generating demand from outside the Los Angeles Area.

Additionally, large amounts of labor and natural resources would be used in the fabrication and preparation of construction materials. These materials are generally not retrievable. However, they are not in short supply, and their use would not have an adverse effect upon continued availability of these resources.

The build alternatives would require a substantial expenditure of funds, which would not be retrievable.

The commitment of these resources is based on the concept that the Los Angeles metropolitan area would benefit from an expanded regional transit system. The benefits of an expanded transit system will be considered when evaluating the proposed commitment of these resources.





## 7.0 MITIGATION MEASURES

This section summarizes the mitigation measures proposed for the particular environmental disciplines affected by construction. Details are described in the sections of this document pertinent to each affected area.

Measures to minimize adverse environmental effects will include:

- Cut-and-cover construction will be minimized and used only at stations and other special structure locations.
- Construction will be phased so that all station areas are not impacted at the same time.
- Cut-and-cover construction will substitute integrated panel decking (typically asphaltic coated steel) in place of wooden plank decking wherever feasible. (Integrated panel decking presents a neater appearance and a smoother roadway surface; it is typically much thinner in cross-section, thereby minimizing the difference in levels between decking and existing grade. It is often, however, more expensive.)
- Contractors will be required to control traffic during construction by following the “Work Area Traffic Control” Manual (most recent edition) prepared by the City of Los Angeles; Standard Plan S-610-12, “Notice to Contractors-Comprehensive” (most recent edition), prepared by Bureau of Engineering, City of Los Angeles; and “Standard Specifications for Public Works Construction” (most recent edition). Comparable standards would be enforced for work conducted in the other jurisdictions along the alignment.
- Before the start of construction, possibly during Final Design, traffic control plans, including detour plans, will be formulated in cooperation with the City of Los Angeles and other affected jurisdictions (County, State). The plans will be based upon lane requirements and other special requirements obtained from the Los Angeles City Department of Transportation for construction within the city and from other appropriate agencies for construction in those jurisdictions. The excavation and decking of arterial streets crossing the rail alignment will be phased so that the capacity of these streets is not reduced unnecessarily.
- Unless unforeseen circumstances dictate, no designated major or secondary highway will be closed to vehicular or pedestrian traffic. No collector or local street or alley will be completely closed preventing local vehicular or pedestrian access to residences, businesses, or other establishments.
- To the extent possible, major surface excavations will be adjacent to undeveloped areas (such as parking lots).
- Additional soil borings will be made in critical areas to precisely define the vertical and horizontal extent of tar sands. These borings will also include in situ measurements of gas content and soil expansion potential. Laboratory testing of tar and sand samples from the borings will be conducted to provide information on their strength and deformation characteristics at different temperatures, confining pressures, strain rates, and stress levels. Based on data derived from the above tests, specific excavation, shoring, and foundation design criteria will be formulated to ensure short and long term stability of project facilities in tar sand areas.



- A multiple-station, constant gas monitoring system will be used in tunnel excavations. The monitoring system will be calibrated to detect minute quantities of gas that would be released as TBMs move into areas of greater gas concentration. As concentrations of gas increase toward limits set to avoid explosive levels in the tunnel, other actions will be taken.
- Where beneficial, small-diameter holes will be drilled at least 20 feet into the tunnel working face ahead of the TBM to relieve pressurized gas pockets before they are encountered by heavy excavation equipment. At the shallow depths of the tunnels gas pressures will be relatively low and easy to handle. Wells can also be sunk ahead of the TBMs so gas can be dissipated (and pumped out if necessary).
- An adequately sized collection and ventilation system will be installed to prevent the buildup of explosive gas concentrations anywhere in the tunnel.
- Final design and construction will be coordinated with Cal OSHA and with the California Bureau of Mines, who have responsibility for compliance with state orders on safety of subsurface tunneling through hazardous materials.
- Related water quality impacts will be avoided by removing the suspended solids in siltation basins and, where necessary, removing hydrocarbons in oil/water separators.
- Construction contractors would be required to immediately clean up any accidentally spilled materials, including not only sediment but also vehicle fuels and lubrication fluids.
- The periodic cleaning of streets and sidewalks in the construction area would also be required to regularly remove the more nominal, day-to-day operational spills.

## **7.1 Alternatives 1, 2, 3, 4, and 5; MOS 1 and 2; and Maintenance and Operation Facility Sites**

### **7.1.1 Traffic, Parking, and Transit**

Mitigation for construction-related traffic impacts will involve development of traffic control plans that will need to be approved by the appropriate public agency. The traffic control plans will provide for the reasonably safe and efficient movement of road users, including pedestrian and bicyclists, through or around the permanent or temporary construction work areas. Information on the traffic control plans are presented in this section. Further details on these plans are in the Traffic Handling and Construction Staging Report (Metro, 2010).

The traffic control plans will need to recognize local agency requirements and guidelines, including:

- City of Los Angeles: CA MUTCD, WATCH Manual, The Standard Specifications for Public Works Construction, "Brown Book" Special Provisions and Standard Drawings (City of Los Angeles), and Standard Worksite Traffic Control Plans (City of Los Angeles)
- City of Beverly Hills :CA MUTCD and WATCH Manual
- City of Santa Monica: CA MUTCD, WATCH Manual, and Traffic Control Plan Preparation Guidelines (City of Santa Monica)
- City of West Hollywood: CA MUTCD and WATCH Manual



- County of Los Angeles: CA MUTCD and WATCH Manual
- Caltrans: CA MUTCD

A traffic control zone is an area of a roadway where road user (vehicle, pedestrian, and bicyclist) conditions are changed due to a construction activity or by a direction of uniformed law enforcement officers. Most traffic control zones are divided into four areas: the advance warning area, the transition area, the construction activity area and the termination area. The traffic control zone also includes the streets identified as the detour routes on the approved traffic control plans. The following sections describe the traffic control zones that would be required at station areas for the Westside Subway Extension.

In order to better facilitate traffic flow and avoid major disruptions and bottlenecks due to construction, Traffic Control Zones (in particular Advance Warning Areas) should extend beyond one arterial street to either side of station construction sites. This will better disperse heavy traffic flows on the major arterials and help the roadway network better absorb the traffic impacts from construction.

Traffic lane maintenance during construction will follow local agency requirements and standards with respect to lane widths, number of lanes and duration of temporary lane closures. During non-working hours, existing traffic lanes including turn lanes and two-way left turn lanes should be restored to the pre-construction/original condition unless otherwise authorized by the local jurisdiction.

Coordination and interaction with appropriate agencies will determine which streets can be closed and the detour routes to be used should streets need to be closed for a limited period of time. The expected year at which construction would take place will be determined so that construction-related traffic impacts.

Temporary traffic signal plans will be required when the following occur:

- Traffic signal equipment is temporarily relocated due to construction
- Traffic signal operation is modified to facilitate construction
- Existing intersection lane configuration is changed
- Visibility of traffic signal equipment is obscured by construction
- As directed by the local agencies having jurisdiction

Each affected agency will determine the need for temporary striping installation or modifications. Temporary striping would be considered for the following conditions:

- When traffic is to be diverted to the left of an existing centerline for two or more consecutive nights.
- When the work area is adjacent to an intersection and results in a transition within the intersection.
- When there is an unusual situation where traffic and physical conditions, such as speed or restricted visibility, occur



- Temporary signs would be implemented per the approved traffic control plans. Temporary sign devices include:
  - ▶ Traffic signs (regulatory, warning and guide)
  - ▶ Changeable message signs
  - ▶ Arrow panels
  - ▶ High-level warning devices
- When signs in a traffic control zone conflict with the implemented traffic control, the signs must be covered by the local agency’s approved method to avoid confusion to the motorist.
- Temporary striping and signing plans shall be prepared by the construction contractor and approved by the agency having jurisdiction.

When the construction activity impacts existing newspaper stands, mail boxes, or bus shelters, an arrangement should be made with each impacted owner for relocation or removal.

Emergency bus stop relocations will require a contractor employee to visit the office of the impacted bus agency to negotiate the needed change. In no event shall the notice be less than 14 days. Prior to implementation of any temporary street closures or any changes affecting bus zone locations, the following transit providers will be contacted at least 100 days in advance of the proposed closure date:

- Metro
- LADOT DASH
- LADOT Commuter Express
- Santa Clarita Transit
- Culver City bus
- West Hollywood CityLine/Dayline
- Santa Monica Big Blue Bus
- Antelope Valley Transportation Authority

When the construction activity impacts the existing on-street parking spaces, parking circulation plans shall be prepared by the construction contractor and approved by the agency having jurisdiction. The parking circulation plan must be coordinated with each impacted property representative.

As part of the DEIS/EIR, a parking impact and policy plan is being prepared for the project. This will be utilized during the subsequent construction and traffic handling phase of the project. Existing parking meters affected by construction within the traffic control zone shall be removed or covered as directed by the agency having jurisdiction. Based on the proposed parking replacement strategy, temporary parking spaces can be considered for the impacted business or residents during construction.



When the construction activity impacts curb side passenger loading or commercial loading zones, loading zone circulation plans shall be prepared by the construction contractor and approved by the agency having jurisdiction. The loading zone plan must be coordinated with each impacted property representative.

When the construction activity encroaches into a sidewalk, walkway, or crosswalk area, special consideration must be given to pedestrian safety, and the following items should be considered for pedestrians in a temporary traffic control zone:

- Pedestrians should not be led into conflicts with work site vehicles, equipment, or operations.
- Pedestrians should not be led into conflicts with vehicles moving through or around the work site.
- Pedestrians should be provided with a safe, convenient, and accessible path.

Access to sidewalks will be maintained on both sides of the street at all Metro construction sites at all times. Access to all businesses by pedestrians also will be maintained at all times without requirement by business owners to make such a request.

All temporary sidewalk designs shall be submitted to Metro for approval prior to installation. Temporary sidewalks need not be expensive, but they must be well built of approved material (wood or other), ADA compliant and having a well built cover. No rough edges or damaged wood will be allowed.

When pedestrians are diverted into the street or adjacent to an open trench, K-rail type concrete barriers or other approved barrier types would be used for barricading between pedestrian and vehicular traffic. Sidewalk closures, if necessary, will be approved by the affected agency having jurisdiction and only one side of the street should be closed at a time.

Pedestrian access to each business property would be provided during the essential hours as requested by the property representative. If acceptable alternate access points are provided, the impacted access may be closed.

As part of the DEIS/EIR, a preliminary bike lane design analysis is being prepared for the project. This information will be utilized during the stage construction and traffic handling phase of the project. The bike lane design analysis will show the existing bike lanes and proposed bike lanes within the vicinity of the project. During the construction phase, Metro-approved bike routes will be maintained past all construction sites, by widened sidewalks or by signed or striped bike detour routes.

When the construction activity impacts the existing business driveways, maintenance of traffic plans would be prepared by the construction contractor showing how vehicular access would be maintained to businesses and approved by the agency having jurisdiction. The construction activity must be coordinated with each impacted property representative.

During construction, driveway entrance and exits would be maintained during essential hours. If acceptable alternate access points (approved by the applicable agency) are provided, the impacted driveway may be closed. The local agency may restrict left-turn and/or right-turn vehicular movements entering and/or exiting driveways during construction.

**7.1.2 Air Quality**

To reduce air quality impacts related to construction activities, the following mitigation measures are recommended to be implemented:

- Mitigation measures such as watering, the use of soil stabilizers, etc. would be applied to reduce the predicted PM<sub>10</sub> levels to below the SCAQMD daily construction threshold levels. The following types of measures would be specified during construction to reduce emissions:
- At truck exit areas, wheel washing equipment would be installed to prevent soil from being tracked onto city streets, and followed by street sweeping as required to clean streets.
- Trucks would be covered to control dust during transport of spoils.
- Spoil removal trucks would operate at a Metro approved emission level, including standards adopted by the Port of Long Beach's Clean Trucks Program, and all.
- Tunnel locomotives (hauling spoils and other equipment to the tunnel heading) would be approved by Metro.
- Metro and its contractors would set and maintain work equipment and standards to meet SCAQMD standards including NOx.
- Continuous monitoring and recording of the air environment would be conducted, particularly in areas of gassy soils. Construction will be altered as required to maintain a safe working atmosphere. The working environment would be kept in compliance with Federal, State, and local regulations.

**7.1.3 Noise and Vibration**

This section identifies feasible mitigation measures and strategies to be incorporated into project designs and construction to minimize noise and vibration impacts.

To reduce the potential for noise and vibration impacts associated with project construction, noise and vibration control measures will be incorporated within Metro's plans, specifications, and estimates ("bid") documents for each segment to reduce potential impacts, including:

- Comply with the City of Los Angeles, City of Beverly Hills, City of Santa Monica, City of West Hollywood, and County of Los Angeles noise ordinance during construction hours. Comply with City of Los Angeles, City of Beverly Hills, City of Santa Monica, City of West Hollywood, and County of Los Angeles standards for short-term operation of mobile equipment and long-term construction operations of stationary equipment, including noise levels and hours of operation;
- Hours of construction activity would be varied to meet special circumstances and restrictions. Municipal and building codes of each city in the Study Area include restrictions on construction hours. The Cities of Los Angeles and Santa Monica limit construction activity to 8 a.m. to 6 p.m. on Monday through Friday and 9 a.m. to 5 p.m. on Saturdays, with no construction on Sundays and federal holidays. The City of Beverly Hills identifies general construction hours of 8:00 a.m. to 6:00 p.m. from Monday through Saturday. The City of West Hollywood restricts construction activity to 8:00 a.m.





to 7:00 p.m. for Monday through Friday. On Saturday, only interior work in West Hollywood may be conducted from 8:00 a.m. to 7:00 p.m. For all the cities in the Study Area, construction is prohibited on Sundays and city holidays. Construction outside of these working periods would require a permit from the applicable city.

- Prepare readily visible signs indicating “Noise Control Zone”;
- Use noise-control devices that meet original specifications and performance;
- Use fixed noise-producing equipment to comply with regulations in the course of project activity;
- Use mobile or fixed noise-producing equipment that are equipped to mitigate noise as much as it is practical;
- Use electrically-powered equipment;
- Use noise control techniques, procedures, and acoustically treated equipment to minimize impact noise;
- Erection of temporary noise barriers and sound-control curtains where project activity is unavoidably close to noise-sensitive receptors;
- Use designated haul routes based on the least overall noise impact Route heavily-loaded trucks away from residential streets, if possible. Select streets with the fewest noise sensitive receptors if no alternatives are available;
- Use non-noise sensitive, designated parking areas for project-related vehicles;
- Locate stockpiles, staging areas, and other noise-producing operations as far as practicable from noise-sensitive receptors;
- Limit use of horns, whistles, alarms, and bells;
- Require contractors to avoid shouting, yelling, screaming or profanity at locations outside the project site boundaries;
- Require all noise-producing project equipment and vehicles to use internal combustion engines equipped with mufflers and air-inlet silencers, where appropriate, in good operating condition that meet or exceed original factory specifications. Mobile or fixed “package” equipment (e.g., arc-welders, air compressors) shall be equipped with shrouds and noise control features that are readily available for that type of equipment.
- Locating fixed noise-generating equipment as far from noise sensitive land uses as is practical.
- Prohibit any project-related public address or music system from being audible at any adjacent receptor.
- Operate earth-moving equipment on the construction lot as far away from vibration-sensitive sites as possible.
- Phase demolition, earth moving, and ground impacting operations so as not to occur in the same time period.
- Avoid nighttime activities.



- Avoid impact pile driving where possible in vibration sensitive areas. Drilled piles or the use of sonic or vibratory pile drivers should be used where the geological conditions permit their use.
- Select demolition methods not involving impact where possible.
- Avoid vibratory rollers and packers near vibration sensitive areas.

#### **7.1.4 Utilities**

This section identifies feasible mitigation measures and strategies to be incorporated into project designs and construction to minimize impacts to public utility services.

The following measures will minimize any potential utility service interruptions and conserve resources:

- Follow Metro Design Criteria and Standards (Volumes I through IV), and applicable utility standards and criteria or best industry practices.
- Comply with applicable utility policies and strategies as specified in the adopted operational comprehensive plans of the City of Los Angeles and the County of Los Angeles, including those provisions related to levels of service, conservation strategies, and coordination of service provisions.
- Incorporate City of Los Angeles, County of Los Angeles, and California State energy code, building code, fire code, Metro’s Design Criteria and Standards (Volumes I through IV), and other applicable requirements into all design aspects of the system, stations, maintenance facility, and parking areas.
- Use standard practices such as installing devices to reduce the impact of stray current between the traction power system and the utilities facilities, or replace particularly metallic utility infrastructure with nonmetallic materials.
- Coordinate with affected water utilities and local fire departments to ensure that water use, especially at the maintenance facility and subway section, does not compromise flow required for fire protection.
- Maintain and protect existing utilities in place during construction.
- Provide temporary connection for services that must be disconnected for extended periods of time.
- Maintain existing service as long as reasonably possible; if necessary, manholes, pipes, vaults, and other access points may have to be relocated.
- Notify users well in advance of any anticipated service disruption and coordinate with the utility owner’s convenient times for necessary service outages.
- Monitor the project’s contractors as part of construction management/oversight and include terms in construction contracts that encourage contractors to actively seek to avoid accidental disruption of service.
- Coordinate the schedules of multiple utility rearrangements in order to minimize negative impacts on users.



- Develop a contingency plan in cooperation with the utility providers for emergency repairs of any utilities unexpectedly found or that disintegrated because of age during excavations.
- Adjust portions of the alignment of station locations, where feasible, to prevent a major utility relocation.
- Comply with the City of Los Angeles and the County of Los Angeles on procedures for utility construction, inspection, and operation.
- Use pipe and conduit support systems, trench sheeting and shoring, and other precautionary measures during construction to minimize the potential for damage to exposed utilities.

### **7.1.5 Business Disruption**

This section identifies feasible mitigation measures and strategies to be incorporated into project designs and construction to minimize impacts to businesses during construction. These mitigation measures are presented in Sections 7.1.1 Traffic, 7.1.2 Air Quality, 7.1.3 Noise and Vibration, and 7.1.4 Utilities. Generally, Metro would provide relocation assistance and compensation for all displaced businesses as required by both the Uniform Act and the California Act. Where acquisitions and relocations are unavoidable, FTA and Metro would follow the provisions of both acts and their amendments. For easements, Metro would appraise each property to determine the fair market value of the portion that would be utilized either temporarily during. Just compensation, which shall not be less than the approved appraisal would be made to each property owner.

Feasible mitigation measures and strategies to be incorporated into project designs and construction to minimize impacts to businesses during construction include:

- Conduct outreach efforts to communicate construction plans and schedules and to discuss key business operating requirements.
- Coordinate with local Chambers of Commerce to develop detailed implementation plans for mitigation measures
- Adjust project construction procedures where feasible to accommodate key business requirements such as delivery and shipping times to maintain critical business activity.
- Hold regular meetings or briefings with business owners
- Use technology for communication with business, including maintained construction status web sites, automated text messaging services, twitter feeds, and similar measures
- Provide additional advertising and business promotion during particular periods of business disruption
- Develop worksite traffic control plans (see traffic sections)
- Require clear access to be maintained to adjacent businesses during normal business hours (see traffic section).
- Require additional signage for affected businesses to facilitate access by customers
- Provide flyers on buses explaining route and stop changes within business corridors (see traffic section)



- Monitoring alternative bicycle and sidewalk and pedestrian access routes to ensure safety and cleanliness. (see traffic section)

## **7.2 CEQA Determination**

This section summarizes the level of impact per CEQA.

### **7.2.1 Traffic, Parking, and Transit**

After the implementation of the listed mitigation measures, potentially significant traffic impacts would continue in the active construction areas through the length of the construction period.

### **7.2.2 Air Quality**

As discussed in Section 6.2, the Air Quality impacts during construction would be significant under CEQA. The SCAQMD thresholds would be exceeded for NO<sub>x</sub> for all Build Alternatives and PM<sub>10</sub> would be exceeded for a typical station with mining. NO<sub>x</sub> levels would be elevated due partially to the proposed use of diesel locomotives to extract soil during the tunnel boring process. Mitigation measures could help to reduce these impacts, but it is unlikely, given the current construction plan, that these levels would be below the SCAQMD threshold.

### **7.2.3 Noise and Vibration**

As discussed in Section 6.3, the noise and vibration impacts during construction would be significant.

### **7.2.4 Utilities**

Because all affected utilities would be relocated, no significant impacts on natural gas, telephone and telecommunications, cable television, water supply, wastewater, or solid waste collection and disposal services are expected during proposed project construction. Minor service disruptions to utility customers during certain periods may occur, but major interruptions are not expected as a result of the sufficient capacity and strategies to provide additional service as the proposed project is constructed. Therefore, no significant impacts would occur.

### **7.2.5 Business Disruption**

Prior to the implementation of the above mitigation measures, significant construction related business disruption impacts would occur in the areas of air quality, noise, transit, traffic, parking, and pedestrian and bicycle movements. Substantial negative effects on business land uses in the construction zones during critical construction periods are also anticipated.

## **7.3 Impacts Remaining After Mitigation**

This section describes the construction impacts that would remain after mitigation measures are implemented.

**7.3.1 No Project**

No significant impacts would occur with this alternative, since no construction would occur.

**7.3.2 Transportation System Management (TSM)**

No significant impacts would occur with this alternative, since no construction would occur.

**7.3.3 Westwood/UCLA Extension**

With the implementation of the above mitigation measures, significant construction related impacts would still remain in the areas of traffic, air quality, noise, and business disruption. No significant impacts to utilities would occur.

**7.3.4 Alternative 2 – Westwood/VA Hospital Extension**

With the implementation of the above mitigation measures, significant construction related impacts would still remain in the areas of traffic, air quality, noise, and business disruption. No significant impacts to utilities would occur.

**7.3.5 Alternative 3 – Santa Monica Extension**

With the implementation of the above mitigation measures, significant construction related impacts would still remain in the areas of traffic, air quality, noise, and business disruption. No significant impacts to utilities would occur.

**7.3.6 Alternative 4 – Westwood/VA Hospital Extension plus West Hollywood Extension**

With the implementation of the above mitigation measures, significant construction related impacts would still remain in the areas of traffic, air quality, noise, and business disruption. No significant impacts to utilities would occur.

**7.3.7 Alternative 5 – Santa Monica Extension plus West Hollywood Extension**

With the implementation of the above mitigation measures, significant construction related impacts would still remain in the areas of traffic, air quality, noise, and business disruption. No significant impacts to utilities would occur.

**7.3.8 MOS 1 – Fairfax Station Terminus**

With the implementation of the above mitigation measures, significant construction related impacts would still remain in the areas of traffic, air quality, noise, and business disruption. No significant impacts to utilities would occur.

**7.3.9 MOS 2 – Century City Station Terminus**

With the implementation of the above mitigation measures, significant construction related impacts would still remain in the areas of traffic, air quality, noise, and business disruption. No significant impacts to utilities would occur.



**7.3.10 Maintenance and Operation Facility Sites**

Since no sensitive receptors would be affected by traffic, air quality, or noise from construction of these sites, and since no disruption of businesses or utilities would occur, no significant construction related impacts would occur from the construction of Maintenance and Operation Facility Sites.

## References

- Air Quality Management District. 2010. Home. Available at: <http://www.aqmd.gov/search/runsearch.asp>. Accessed 3.9.2010.
- Baroid Drilling Fluids, Inc. product data sheets.
- Brian Jacobs, Dennis Jensen, Larry Taylor and Thomas Zdeb. 1999. Rapid Excavation and Tunneling Conference (RETC) - Hydrogen Sulfide Controls for Slurry Shield Tunneling in Gassy Ground Conditions - A Case History.
- California Climate Change Portal. 2009. Governor Schwarzenegger Executive Order S-13-08. Available at: <http://www.climatechange.ca.gov/adaptation/>. Accessed 3.9.2010.
- California Department of Transportation. 2009. California Metropolitan Planning Organization (MPOs) and Regional Transportation Planning Agencies (RTPAs). Available at: [http://www.dot.ca.gov/hq/tpp/offices/orip/index\\_files/MPO-RTPA\\_1-10.pdf](http://www.dot.ca.gov/hq/tpp/offices/orip/index_files/MPO-RTPA_1-10.pdf). Accessed 3.8.2010.
- California Department of Transportation. 2008. *2008 Traffic Volumes on California State Highways*, State of California Department of Transportation, Traffic Operations Division.
- California Environmental Protection Agency Air Resources Board. 2010. ARB Programs Climate Change. Available at: <http://www.arb.ca.gov/cc/ab32/ab32.htm>. Accessed 3.9.2010.
- California Environmental Protection Agency Air Resources Board. 2010. Climate Change SB 375 Implementation. Available at: <http://www.arb.ca.gov/cc/sb375/sb375.htm>. Accessed 3.9.2010.
- California Environmental Protection Agency Air Resources Board. 2009. Research Activities Ambient Air Quality Standards. Available at: <http://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm>. Accessed 3.8.2010.
- California Environmental Resources Evaluation System. 1969. CEQA. Available at: <http://ceres.ca.gov/ceqa/>. Accessed 3.9.2010.
- California. Gov. 2008. California Air District Map for District Rules. 3.9.2010. Available at: <http://www.arb.ca.gov/drdb/dismap.htm> Accessed 3.9.2010.
- California State Architect. 2007. Title 24 Overview. Available at: <http://www.dsa.dgs.ca.gov/Code/title24.htm>. Accessed 3.9.2010.
- CDM. 2010. Westside Subway Extension Drainage Design Technical Memorandum (Preliminary Basis of Design Report Section 8).
- CERES. 2007. CEQA Noise Standards. Title 14. California Code of Regulations, Chapter 3. 3.9.2010. Available at: <http://ceres.ca.gov/ceqa/guidelines/art19.html>.
- CERES. 2005. Guidelines for the Implementation of the California Environmental Quality Act, 15000 – 15387. Appendix G. Available at: [http://ceres.ca.gov/ceqa/guidelines/Appendix\\_G.html](http://ceres.ca.gov/ceqa/guidelines/Appendix_G.html). Accessed 3.9.2010.
- City of Beverly Hills. 2009. Beverly Hills Municipal Code. Available at: [http://www.sterlingcodifiers.com/codebook/index.php?book\\_id=466](http://www.sterlingcodifiers.com/codebook/index.php?book_id=466). Accessed 3.9.2010.
- City of Beverly Hills. 2008. Draft General Plan. Available at: [http://www.beverlyhills.org/services/planning/plan/draft\\_general\\_plan.asp](http://www.beverlyhills.org/services/planning/plan/draft_general_plan.asp). Accessed 3.8.2010.
- City of Los Angeles. 2007. Bureau of Engineering. Work Area Traffic Control Manual.



- City of Los Angeles. 1999. Department of City Planning. Noise Element. Available at: <http://cityplanning.lacity.org/cwd/gnlpln/noiseElt.pdf/>. Accessed 3.8.2010.
- City of Los Angeles. 1993. General Plan Master Plan Framework. Available at: <http://cityplanning.lacity.org/cwd/framwk/chapters/00/00.htm>. Accessed 3.9.2010.
- City of Los Angeles. 2009. Los Angeles Municipal Code. Available at: [http://www.amlegal.com/nxt/gateway.dll?f=templates&fn=default.htm&vid=amlegal:lamc\\_ca](http://www.amlegal.com/nxt/gateway.dll?f=templates&fn=default.htm&vid=amlegal:lamc_ca). Accessed 3.8.2010.
- City of Los Angeles. 2001. Wilshire Community Plan. Available at: <http://cityplanning.lacity.org/complan/pdf/wilcptxt.pdf>. Accessed 3.9.2010.
- City of Santa Monica. Department of City Planning Land Use Element. Available at: <http://www.shapethefuture2025.net/links.html>. Accessed 3.8.2010.
- City of Santa Monica. 1999. Noise Element of the General Plan Goals, Policies, and Implementation.
- City of Santa Monica. 2004. Santa Monica Civic Center Specific Plan EIR, Section 4.10 Noise.
- City of Santa Monica. 2010. Santa Monica Municipal Code. Available at: <http://www.qcode.us/codes/santamonica/>. Accessed 3.8.2010.
- City of West Hollywood. 2004. General Plan, Section 1.0 Land use and Urban Design; Section 17.0 Noise.
- City of West Hollywood. 2009. West Hollywood Municipal Code. Available at: <http://qcode.us/codes/westhollywood/>. Accessed 3.9.2010.
- Cornell University Law School. 1990. Legal Information Institute. 3.9.2010. Available at: Website: [http://www.law.cornell.edu/uscode/42/usc\\_sec\\_42\\_00007506----000-.html](http://www.law.cornell.edu/uscode/42/usc_sec_42_00007506----000-.html).
- County of Los Angeles. 1980 & 1975. Department of Regional Planning General Plan Update Program Land Use & Noise Elements. 3.9.2010. Available at: [http://planning.lacounty.gov/assets/upl/project/gp\\_webch03.pdf](http://planning.lacounty.gov/assets/upl/project/gp_webch03.pdf)
- County of Los Angeles. 2010. Los Angeles County Code. Available at: <http://search.municode.com/html/16274/index.htm>. Accessed 3.8.2010.
- Federal Register Presidential Documents. 1994. Title 3 Executive Order 12898. Available at: <http://www.archives.gov/federal-register/executive-orders/pdf/12898.pdf>. Accessed 3.10.2010.
- Federal Transit Administration. 2006. Transit Noise and Vibration Impact Assessment, FTAVA- 90-1003-06.
- Harris, C.M. 1998. Handbook of Acoustical Measurements and Noise Control, Third Edition, Acoustical Society of America, Melville, New York.
- Metro. 2009. Advanced Conceptual Engineering Report.
- Metro. 2009. Westside Extension Transit Corridor Study: Metro Red Line Vibration Study.
- Metro. 2009. Traffic Handling and Construction Staging Report.
- Metro. 2010. Economic and Fiscal Impact Analysis and Mitigation Technical Report.
- Metro. 2010. Air Quality Technical Report.
- Metro. 2010. Cultural Resources Technical Report.
- Metro. 2010. Transportation Impacts Technical Report.
- Metro. 2010. Real Estate-Acquisitions Technical Report.
- Metro. 2010. Geotechnical and Hazardous Materials Technical Report.



- Metro. 2010. Land Use and Development Opportunities Technical Report.
- Metro. 2010. Noise and Vibration Technical Report.
- Michael Traylor, Michael Jatzak, and Brett Robinson. 2003. Rapid Excavation and Tunneling Conference (RETC) - Construction of the Detroit River Outfall No. 2- Proceedings.
- National Archives and Records Administration. 1982. Title 23: Highways. Available at: <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=161ee259bad067b5f3dd74fa8349883b&rgn=div5&view=text&node=23:1.0.1.8.44&idno=23>. Accessed 3.10.2010.
- SLOG Regional Transportation Plan. 2007. References. Available at: [http://www.slocog.org/Library/PDF/Reports\\_Publications/4\\_Regional%20Trans%20Plan/5\\_References.pdf](http://www.slocog.org/Library/PDF/Reports_Publications/4_Regional%20Trans%20Plan/5_References.pdf). Accessed 3.10.2010.
- Southern California Association of Government. 1966. About Us. Available at: <http://www.scag.ca.gov/about.htm>. Accessed 3.8.2010.
- Southern Coast Air Quality Management District. 1993. Air Quality Handbook.
- Transportation Research Board. 2000. 2000 Highway Capacity Manual.
- United States Department of Transportation Federal Transit Administration. 1995. Highway Traffic Noise Analysis and Abatement Policy and Guidance. Website: <http://www.fhwa.dot.gov/environment/polguid.pdf>. Accessed 3.8.2010.
- United States Department of Transportation Federal Transit Administration. 2006 Transit Noise and Vibration Impact Assessment. Available at: United States Department of Transportation Federal Transit Administration: [http://www.fta.dot.gov/documents/FTA\\_Noise\\_and\\_Vibration\\_Manual.pdf](http://www.fta.dot.gov/documents/FTA_Noise_and_Vibration_Manual.pdf). Accessed 3.9.2010.
- U.S. Environmental Protection Agency. 1971. Noise from Construction Equipment and Operations, Building Equipment and Home Appliances.
- United States Environmental Protection Agency. 1990. Laws and Regulations. Available at: <http://www.epa.gov/regulations/laws/caa.html>. Accessed 3.9.2010.
- United States Environmental Protection Agency. 1990. Technology Transfer Network National Ambient Air Quality Standards. Available at: <http://www.epa.gov/ttn/naaqs/>. Accessed 3.9.2010.