SECTION 2

QUADRANT CONSTRUCTION

In the previous pages, we outlined your responsibilities as a Quadrant homebuyer. The following information will give you an overview of how each Quadrant home is carefully crafted during the construction schedule. Here are some terms you may hear at orientation meetings with your Superintendent:

Codes and Permits

› Building Code

One of the amazing things about American homes is that the vast majority of them are built using completely standardized building practices. One reason for this consistency is a set of uniform building codes that apply across the country.

While zoning codes deal with your property and the relationship of your building to the neighborhood, building codes deal with the building itself. These codes establish, by law, the minimum acceptable standards for construction, electrical, plumbing, and mechanical systems. They are designed to safeguard health and safety in every building, and are firmly adhered to when we are building your new home.

Your CSM or Superintendent will be happy to explain any code item that applies to your home you might not understand.

› Building Permit

A building permit is required for any new construction. Additional sub-permits are also required for utilities, plumbing, heating, cooling, and electrical work.

In order to approve your building permit application, the plan checker or building inspector needs to have a clear picture of your home. Quadrant creates a detailed set of plans for each home we build. Because Quadrant builds in many communities throughout the Northwest, plans are reviewed by many jurisdictions (governments), so there is little room for error. Our permitting department works closely with the design and production departments as well the jurisdictions to obtain your permit as quickly as possible.

Homesite

The homesite you chose is inspected for quality at a very early stage. Before your home is released, our permitting department "sites" the footprint of the house on the lot. The superintendent reviews the site plan and places small pins in the soil to mark the precise location of the home's footprint. This gives a general outline of where the footing – the concrete "platform" that the foundation sits on and where the weight of the house is distributed into the soil – should be poured. Once the footings are placed, pending weather, the foundation can be poured.

Foundation and Crawl Space

The crawl space does a number of things for the home. It elevates the house off of the ground (especially important in damp areas) and accommodates variations in the topography of the site. Ductwork, electrical wiring and plumbing run through the crawl space, making them easier to service.

The concrete foundation wall is what creates the crawl space. The foundation distributes the weight of the structure and its occupants, and at the same time, holds the wood frame structure of the home to the ground in case of heavy winds or earthquakes.

Within the concrete foundation wall is reinforcing steel. This reinforcement is what enhances the concrete's strength. Concrete is very good in compression, and steel allows for tension strength.

Concrete girder pier "pads" scattered in the middle of the crawl space are there to support the posts and beams in the crawl space. These beams in turn support the I-joist for the main floor.

Under-floor areas, such as the crawl space, are ventilated by openings in the exterior foundation walls or joist bays. These openings are specifically located to provide cross ventilation, and are screened with corrosion resistant wire mesh.

A challenge that arises in crawl spaces and basements is dampness. In order to keep water out, perforated pipe and gravel are used in a trench around the crawl space to route water away. The drainage system also handles water that might get into the crawl space. That's why we slope and trench inside to allow for water to escape. The pipes and gravel are then backfilled with dirt that slopes away from the house to drain.

Framing

› I-Joists

I-joists are engineered wood systems that support the main floor. I-Joists are designed to be straighter, stiffer, stronger and more consistent in performance than solid sawn lumber joists. The wood used is re-engineered in a sophisticated manufacturing process to produce a product that outperforms traditional lumber.

On top of the I-joists goes the oriented strand board (OSB) floor decking. The flooring edges are tongue and groove joints.

The floor framing is connected with bolts from the foundation to the sill plate. The I-joists and rim joists are then nailed to the sill plate, and in turn, the OSB floor decking is nailed to the joists and rim joists.

In addition, there is a variety of steel hardware designed to connect the framing to the foundation. The engineer specifies this hardware (such as foundation straps) to suit the design of the house.

› Wall Framing

Most of the studs are "finger-jointed." Finger-jointed studs are ideal for use in single home construction, and provide significant benefits. For studs, straightness is a very important characteristic. Finger-jointed studs are straight and dimensionally stable because they are manufactured from short pieces of kiln-dried lumber – trims from the sawmill operation. Walls built with finger-jointed studs are straighter, even when subjected to heat or humidity. This helps eliminate nail pops in drywall and other related wall problems, resulting in fewer costly callbacks. Furthermore, time is saved by not having to sort through warped studs, and valuable lumber is saved by using smaller pieces that would have otherwise gone to waste.

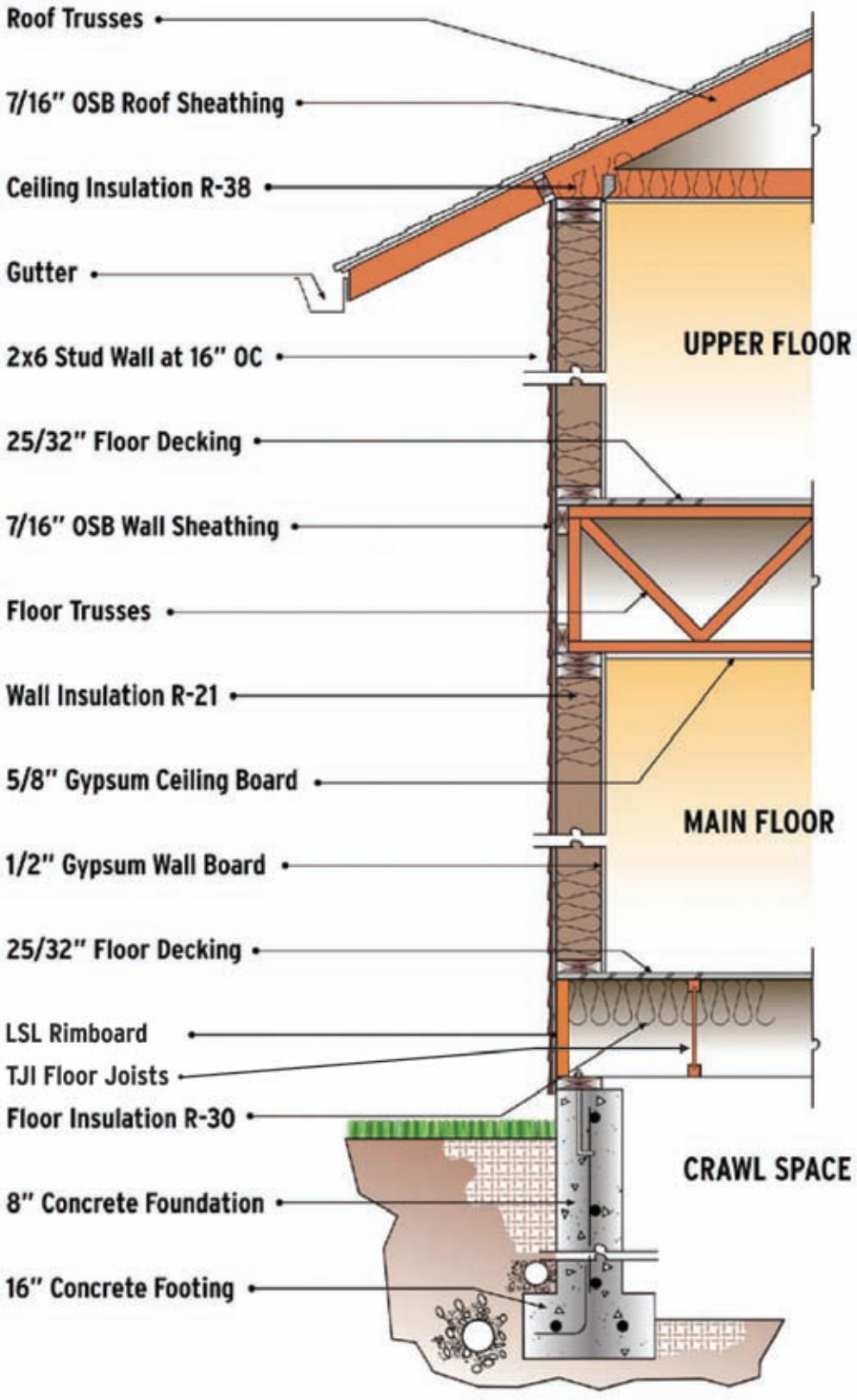
Using OSB wall sheathing adds rigidity – you may have seen diagonal pieces used at the corners of older homes (built before plywood and OSB were widely available). The OSB does the same thing, but it provides much more strength.

› Building Wrap

When walls are built, they are covered in a building wrap as a standard construction practice. Building wrap acts like a windbreaker that is wrapped over the sheathing and under the exterior siding. It is then cut out around windows and doors. The building then resists water intrusion, and thus makes for a more comfortable, energy-efficient home.

› Floor Trusses

The upper floor is built with floor trusses. We use floor trusses because they provide longer, stronger clear spans and greater design flexibility in locating bearing walls and partitions on the main floor. Because the floor truss system can be spaced farther apart, fewer are needed. They can be built to exact lengths in the shop and delivered to the job site ready for installation. The lightweight, rigid floor trusses go up easily and quickly, often without the use of a crane.


Roof Trusses
7/16" OSB Roof Sheathing
Ceiling Insulation R-38
Gutter
2x6 Stud Wall at 16" OC
25/32" Floor Decking
7/16" OSB Wall Sheathing
Floor Trusses
Wall Insulation R-21
5/8" Gypsum Ceiling Board
1/2" Gypsum Wall Board
25/32" Floor Decking
LSL Rimboard
TJI Floor Joists
Floor Insulation R-30
8" Concrete Foundation
16" Concrete Footing
UPPER FLOOR
MAIN FLOOR
CRAWL SPACE

> Roof Trusses

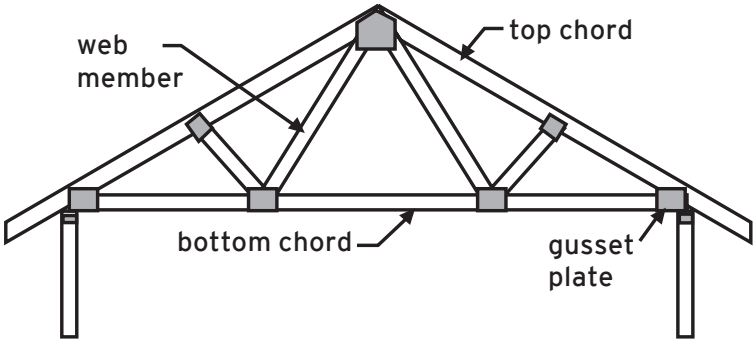
Our homes use roof trusses for the roof framing. Trusses are pre-fabricated, triangulated wooden structures used to support the roof and have a number of significant advantages, such as strength, efficiency, and flexibility to span longer distances.

Roof trusses come in several standard configurations: "W" truss, "M" truss or "scissor" truss. Each performs a different task. "Gable" trusses are used at the ends of the roof (the outermost trusses on either end). The vertical pieces are 16 inches on center so that siding can be nailed to them. The trusses are attached to the walls with small metal plates.

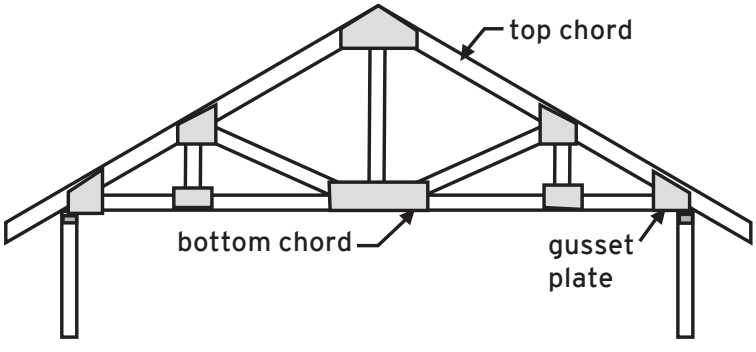
Once the trusses are up, the roof is covered in roofing OSB, which gives the roof tremendous rigidity.

Once roof sheathing has been completed, it is covered by roofing felt (sometimes referred to as "tar paper" or "building paper"). Roofing felt acts as a waterproof barrier between the sheathing and roofing material. We apply the roofing felt to the clean surface shortly after sheathing is completed to protect it from weather.

ROOF TRUSSES - OVERVIEW



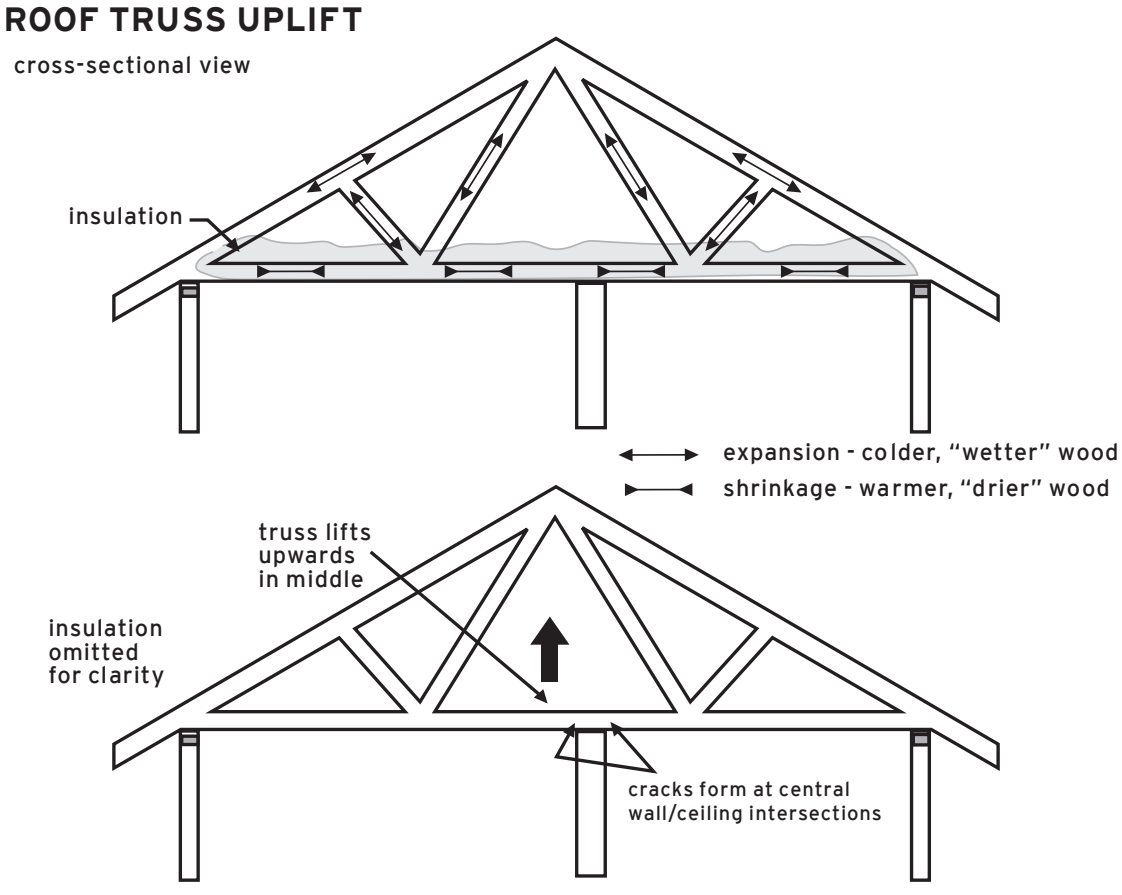
Gusset plates can be metal (shown above) or plywood (shown below)



› Truss Uplift/Partition Separation

Some homes may experience a separation or gap where the ceiling meets the wall in certain areas on the upper floor. This is not a cause for panic nor is it a defect in your home. It is a phenomenon known in the building industry as truss uplift (sometimes referred to as *partition separation*). It is common in homes built with roof trusses instead of rafters.

If a house suffers from truss uplift, the top floor ceilings literally lift off the interior walls in the winter and drop back down in the summer. At first glance, one might assume that the floors have settled. Actually, the ceiling has gone up - sometimes creating a gap of as much as two inches where interior walls meet the ceilings. Typically, when truss uplift happens, it is most dramatic the first year after the home is built and decreases with time.



› Why Truss Uplift?

The way in which houses are built has changed over the years. Attics of newer houses have more insulation and ventilation. They also have roof trusses instead of rafters and ceiling joists.

The bottom chord of a truss is buried below a deep blanket of insulation. Even on the coldest days the bottom chord is insulated and warm. In such cases, it is also contracting. The top chords are doing just the opposite because they are above the insulation, they absorb moisture from the air, which causes them to elongate.

With the top chords growing and the bottom chord shrinking, the truss arches upward in the middle, causing the ceilings to lift off the walls. In the summer, this cycle reverses itself.

› Examples of Truss Uplift