Map Unit Properties Table

Age	Unit Name (Symbol)	Features and Description	Erosion Resistance	Suitability for Development	Hazards	Potential Paleontologic Resources	Potential Cultural Resources	Mineral Specimens	Potential for Karst Issues	Mineral Resources	Habitat	Recreation Potential	Global Significance	Limits on restoration
QUATERNARY	Alluvium (Qal), Colluvium (Qc)), Landslide Deposits Qls); Older alluvium and colluvium (Qoac); Pediment Deposits (Qp)	Alluvium is composed of clay, silt, sand, and gravel with some minor colluvium and slopewash as well as poorly sorted flash flood deposits; thickness from 0- 40 ft (0- 12 m.); colluvium composed of slopewash or mass- wasting debris with local talus and slump deposits; thickness between 0- 30 ft (0- 9 m). Landslide deposits consist of slides or mudflows derived from Tropic Shale and slide or slump blocks from Straight Cliffs Formation; thickness 0- 100 ft (0- 30 m). Older alluvium and colluvium include gravels from East Fork Sevier River and other mixed origins; gravels are mostly limestone derived from Claron Formation, with some volcanic clasts. Unit ranges in thickness from 0- 60 ft (0 to 18 m). Pediment deposits comprised of sand and gravel and some alluvial fan deposits; coarse clasts are limestone, chert and quartz in a sandy, calcareous matrix; some terrace deposits locally; unit ranges in thickness from 0- 100 ft (0 to 30 m).	Low to very low	Unconsolidated material may be unstable along slopes and in wet environments such as springs or bogs; high permeability may render this unit unsuitable for waste facility development.	Slumping, sliding, mass wasting and debris flows all possible for these units.	None documented	Native American dwellings or tools possible	None documented	None	Gravel, sand, pebbles, clay and silt deposits	Valleys are floored with this loose material making it available to wildlife habitat	Good for trails, picnic areas and campground, light recreational use	Fine examples of erosional deposits in badland area	Only where clay content is high
TERTIARY	Conglomerate at Boat Mesa (Tbm)	Ranges in thickness between 0- 100 ft (0 and 30 m), white, light brown, tan and gray; contains calcareous sandstone and conglomeratic limestone; coarsest clasts are pebbles of black, gray and tan chert and tan quartzite; cemented with white silica and locally contains volcanic tuff and ash beds.	High to very high	Present only on tops of mesas.; if altered volcanic material present, swelling clays may pose a problem for road development; due to highly fractured nature of unit, waste facility development is not recommended; should be suitable for most other development.	Rockfall hazard is extreme due to plucking of large cobbles and unit's exposure atop mesas in Bryce Canyon National Park.	None documented	Chert pebbles might have been used for tools; outcrop extent may have spiritual significance.	None documented	Not enough carbonate present	Gravel, and potential building material	Plucked cobbles may provide vugs for nesting; forms surface of mesas	Unit can be attractive to climbers; other use is possible	Tertiary unit unique to this area, coarse conglomerate	Only where unit is compromised by fractures
TERTIARY	Claron Formation, White limestone member (Tcw)	Member 0- 300 ft (0 and 91 m) in the BRCA area; homogenous white, light gray or tan cliff- forming limestone; fine- grained to microcrystalline and generally thick-bedded to massive with indistinct bedding structures; local beds of thin purplish gray mudstone present as interbeds with some scant sandstone beds.	Moderate to high	Limited in areal extent, but should be suitable for most forms of development unless highly fractured or eroded which would make waste facility development problematic and slopes unstable.	Rockfall hazard in canyons and on slopes; some block slide potential on slopes	Scant fossils of freshwater snails and clams	Native American legend interpretation	None documented	Karst landforms are present in this unit	Limestone	Forms canyons and caps badland formations for variety of desert wildlife habitat	Not recommended for most recreational use unless unit is intact, climbing possible	Caps BRCA characteristic hoodoos	Delicate hoodoo geomorphology

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TERTIARY	Claron Formation, Pink limestone member (Tcp)	Ranges in thickness between 400- 700 ft (122 to 213 m), color from pale pink to red, pale orange and tan; very fine- grained, thin to thick- bedded with cyclic sediments ranging from limestone to argillaceous limestone and dolomitic limestone; thin interbeds of gray or tan calcareous mudstones in the dolomites render beds more resistant to erosion; grains are quartz, carbonate, and chert; basal, channelized conglomerate between 0- 40 ft (0- 12 m) occurs locally and contains clasts of quartzite, chert, and limestone.	Moderate to low	Unit responsible for development of hoodoos in the BRCA area, development not recommended, but in intact areas, unit should be stable for most foundations and buildings.	Heterogeneity of formation causes severe rockfall hazards in canyons and along trails; very susceptible to slumping and sliding as mass wasting along slopes.	Abundant root casts and plant fossils: *Physa pleromatis*, *Physa bridgerensis*, *Physa* sp., *Bulinus* sp., *Planorbis utahensis*, *Viviparous trachiformis*, *Goniobasis* sp.	Native American legend interpretation	Hematite responsible for brilliant colors	Karst landforms are present in this unit	Some gravel potential and building material; limestone & hematite deposits	Forms canyons and badlands for desert wildlife habitat; hoodoos provide nesting sites	Not recommended for most recreational use unless unit is intact	Forms incredible hoodoos and other badland formations	Delicate hoodoo geomorphology
CRETACEOUS	Kaiparowits Formation (Kk)	More than 2789 ft (850 m) thick on the nearby Kaiparowits Plateau; composed of light brown, tan and greenish- gray, very fine- grained friable sandstone and buff, fine- grained, lenticular sandstone interbedded with light gray to purplish- gray or tan mudstones and brown, white and greenish limestone; pebble conglomerate lenses locally with pebbles averaging 2.5 cm (1 in) in diameter.	Moderate	Friable sandstones may render unit unstable for foundations, but otherwise unit is suitable for most development unless highly fractured.	Rockfall hazard where unit is present on cliff faces and/or highly fractured; limestone layers may dissolve causing undercutting on slopes; mudstones pose slumping hazard.	Fossil rich with vertebrate bones, petrified wood, invertebrates and concretions: *Dammarites, Podozamites, Platanus, Betula, Menispermites, Cinnamomum, Viburnum, Adocus* sp., *Baena nodosa, Basilemys* sp., *Hadrosauridae, Nodosauridae, Theropoda, Trionychid turtle, Bulinus subelongatus, Campeloma* sp., *Goniobasis subtortuosa, Helix* sp., *Physa reesidei, Planorbis* sp., *Unio* sp., *Viviparus leai*	None documented	Concretions	Not enough carbonate present	None documented	Limestone- dissolved vugs on cliff faces may provide nesting habitat	Good for most recreational use; hazardous for climbers	Abundant Cretaceous fossils	Only if unit is extremely friable
CRETACEOUS	Wahweap Formation (Kw)	Unit ranges in thickness between 0- 700 ft (0 and 213 m); lower part is buff to light brown, fine- grained, lenticular sandstone interbedded with gray to tan mudstone and thin beds of light gray to white siltstone; upper beds are light gray to white fine to coarse- grained sandstone and conglomeratic sandstone; sandstone is crossbedded and locally contains small pebbles of gray chert and tan quartzite; locally cemented with calcite and iron oxide. Some gypsum beds.	Moderate to very high	Suitable for all forms of development unless significant fractures are present; fractures may render unit unsuitable for some septic system development; gypsum- rich beds may dissolve out causing some instability for foundations; sandstones cemented by gypsum may also be friable; iron oxide cements (rusty color) are most stable in unit.	Rockfall hazard where unit is present on cliff faces and/or highly fractured, gypsum rich beds may undermine unit integrity causing sliding.	Petrified wood and fossils: *Neritina* sp., *Physa* sp., *Viviparus* sp., turtle bones, leaf impressions	Chert could have provided Native American tool material	Chert nodules	None	Gypsum, flagstone	None documented	Attractive for rock climbers, good trail base; stable for most uses	Abundant Cretaceous fossils	None documented
CRETACEOUS	Straight Cliffs Formation, Upper Part (Drip Tank, John Henry and Smoky Hollow Member) (Ksu, Ksc)	This unit ranges in thickness between 900 - 1300 ft (274 and 396 m); lowermost beds buff, tan and light- brown in color & consist of very fine- grained to fine- grained sandstone interbedded with gray to tan mudstones; ~100 ft (30 m) above base is a 30 ft (9 m) thick interval of carbonaceous shale with thin coal interbeds; uppermost beds of unit are composed of white sandstone containing lenses of pebble conglomerate; sandstone is thick- bedded to massive, medium- to coarse- grained and crossbedded; upper beds form steep slopes or sandy, gravel covered benches between slopes.	Moderate	Suitable for most construction; may be unsuitable where concentration of mudstone is high and unit forms benches, especially if unit is water saturated; high fracture concentration limits waste facility development and building near slopes.	Slumping potential on gravel covered benches between slopes; rockfall hazard where unit is undercut along a cliff; coal bed fires a possibility during lightning storms; high concentrations of carbonaceous mudstone may render portions of unit unstable if exposed on a slope.	*Admetopsis subfusiformis, Anomia* sp., *Barbatia micronema, Campeloma* sp., *Cardium curtum, Certithium* sp.,*Corbula, Cyrena securis, Fusus venenatus, Glauconia coalvillensis, Gyrodes depressus, Maetra arenaria, Neritina bellatula, Nucula coloradoensis, Ostrea prudentia, Planorbis* sp., *Plicatula hydrotheca, Physa* sp., *Turbonilla coalvillensis, Turritella whitei, Viviparus* sp., *Volsella multilinigera*	None documented	None documented	Not enough carbonate present	Coal, natural gas	None documented	Good for trails, picnic areas & campgrounds, light recreational use	Distinctive coal zone in this unit, equivalent to nearby Henderson coal zone.	None documented

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CRETACEOUS	Straight Cliffs Formation, Lower Part (Tibbet Canyon Member) (Ksl)	Grades from very fine- grained, flat-bedded to low- angle crossbedded, cliff-forming sandstones, buff and tan in color, to sandstone and carbonaceous mudstone interbeds; interbedded throughout local thin coal beds and two distinctive coal beds with serve as bounding layers between the two parts; uppermost layers are fine- to medium- grained, poorly sorted, crossbedded sandstone white to light- gray and containing lenses of conglomeratic sandstone; locally upper beds contain some pebble conglomerate; pebbles are polished, resembling gastroliths found in association with dinosaur remains; 320 - 400 ft (98 to 122 m).	High	Suitable for most development; if highly banded, may be unstable along slopes; if highly fractured in proposed area, waste facility development is not recommended.	Rockfall hazard where unit is undercut along a cliff; coal bed fires a possibility during lightning storms; high concentrations of carbonaceous mudstone may render portions of unit unstable if exposed on a slope.	Possible gastroliths present throughout unit.	Cliffs of this unit may display petroglyphs and desert varnish	None documented	Not enough carbonate present	Coal	Cliff unit with potential for nesting habitat	Good for most recreational use; if highly interbedded may prove hazardous for climbers	Forms cliffs and escarpments in the BRCA area; may contain gastroliths from dinosaurs.	None documented
CRETACEOUS	Tropic Shale (Kt)	700- 1000 ft (215 to 305 m) thick; gray to olive- gray, sandy to clayey shale; lower part contains very thin beds of tan bentonitic clay and a basal limestone concretion zone; upper beds - thin, very fine- grained sandstone interlayered with mudstone; locally gypsum rich; equivalent to Mancos Shale elsewhere on Colorado Plateau.	Low	Forms unstable slopes, unsuitable for most development, especially roads and buildings; bentonite also makes most development risky.	Slumping and sliding very possible	Very fossil rich unit, especially in basal limestone concretion zone, marine fossils, *Anchura* sp., *Anomia* sp., *Certthium n.*, *Corbula nemtatophora*, *Cyrena aequilateralis*, *Exiteloceras pariense*, *Fusus venenatus*, *Glauconia coalvillensis*, *Inoceramus* sp., *Lima utahensis*, *Liopisha meeki*, *Lunatia* sp., *Metoicoceras whitei*, *Ostrea prudentia*, *Sperula* sp., *Sigaretus textilis*, *Turritella whitei*, *Admetopsis subfusiformis*, *Cyrena* sp., *Legumen* sp., *Lucina* sp., *Maetra* sp., *Tellina* sp., *Volsella multinigera*, *Anatina* sp., *Exogyra olisoponensis*, *Gryphaea newberryi*, *Trochocyathus*.	Possible Native American tool material	Selenite crystals	None	Gypsum, coal, oil shale	Friability allows for burrowing	Possible trail base; unstable for most uses	Abundant fossils, deep marine environment	None documented
CRETACEOUS	Dakota Formation (Kd)	180- 300 ft (55 to 91 m) thick; comprised of interbedded buff to light- brown sandstone, gray to tan mudstone and dark carbonaceous mudstone and some coal beds; local pebble conglomerate in lower beds.	High	Suitable for all forms of development unless significant fractures are present; fractures may render unit unsuitable for some septic system development.	Rockfall potential if sandstone is fractured and exposed along a cliff face	Oyster beds, petrified wood, and macerated fossil plant rich beds	Possible Native American petroglyphs and settlements	None documented	None	Flagstone, coal, fossil fuel reservoir rock	None documented	Suitable for all uses, rock climbing	Widespread Cretaceous unit	None documented
JURASSIC	Entrada Sandstone (Escalante Member) (Je)	See Entrada Sandstone, see below.	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below	See below
JURASSIC	Entrada Sandstone (Cannonville Member) (Je)	300- 500 ft thick (91 to 152 m), light tan to white, locally red banded, very fine- grained sandstone and silty sandstone; generally flat bedded and weakly to moderately cemented with gypsum, rendering it friable; interbeds include red beds, limestone, shale and gypsum.	Low to Moderate	High gypsum content renders unit friable and unstable for most foundations and developments; Okay for light use such as picnic areas, trails, etc.	Unstable on slopes, high slide & slump potential	Fossils not present at BRCA as elsewhere	None documented	Gypsum	Unlikely; some potential in limestone beds	Gypsum deposits, limestone	Vugs in cliff faces may provide nesting habitat	Suitable for trails and picnic areas	Regionally continuous unit	None documented

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JURASSIC	Entrada Sandstone (Gunsight Butte Member) (Je)	White to red, fine to medium grained, crossbedded sandstone.	Moderate to high	Suitable for all forms of development unless significant fractures are present; fractures may render unit unsuitable for some septic system development.	Rockfall potential where sandstone is exposed on cliffs	Fossils not present at BRCA as elsewhere	Possible Native American petroglyphs and settlements	None documented	None	Flagstone and building material potential	None documented	Rock climbing potential, mountain biking	Regionally continuous unit, with tectonic correlative significance	None documented
JURASSIC	Carmel Formation (Upper Member, limestone marker bed) (Jcu, Jcul)	600- 700 ft (183 to 213 m) thick, composed of red, pale- orange, and white sandstone, silty sandstone and mudstone; all fine-grained; marker bed of light- gray limestone occurs low in unit, about 15 ft (5 m) thick; upper part contains silty sandstone, mudstone and thin tan to white gypsum beds.	Moderate	Suitable for most development unless gypsum is present; limestone and gypsum dissolution as well as highly fractured sandstone beds may render unit unstable and a poor choice for waste facility development.	Unstable slope where gypsum beds are concentrated or limestone dissolved; rockfall where sandstone is fractured	Fossils not present at BRCA as elsewhere	None documented	Gypsum	Unlikely, some potential in limestone beds	Gypsum deposits, limestone	Vugs in cliff faces may provide nesting habitat	Suitable for trails and picnic areas	Regionally continuous unit, with tectonic correlative significance	None documented
JURASSIC	Carmel Formation (Gypsiferous member and Thousand Pockets Tongue of Page Sandstone) (Jcgt)	About 30- 50 ft (9 to 15 m) thick, composed of white, yellowish- gray or rust- colored crossbedded sandstone; interbedded with thick- bedded, massive white gypsum in lower beds which grade upward into gray or greenish- gray mudstone and gypsiferous mudstone.	Moderate	Sandstone- rich beds are fine for most development unless highly fractured; fractures increase permeability making unit poor for waste system facilities; gypsum- rich beds are easily dissolved and unstable for development.	Unstable slope where gypsum beds are concentrated; rockfalls where sandstone is fractured	Fossils not present at BRCA as elsewhere	None documented	Gypsum	None	Gypsum deposits	None documented	Suitable for trails and picnic areas	See above	Only where gypsum dissolution is extreme
JURASSIC	Carmel Formation (Banded member) (Jcb)	Approximately 100 ft (30 m) thick; unit is red, fine- grained sandstone and mudstone with some thin- bedded gray to white sandstone and greenish- gray mudstone interbedded.	Moderate	Unit is suitable for most development; if highly banded, unit may be unstable along slopes.	Rockfall and slide potential where mudstone is highly concentrated	Fossils not present at BRCA as elsewhere	None documented	None documented	None	None documented	None documented	Suitable for all uses	See above	None documented
JURASSIC	Carmel Formation (Lower member, Limestone member) (Jcl)	About 120 ft (37 m) thick, gray, thin- bedded limestone; forms cliffs and is interbedded with thin- bedded blue- gray mudstone, shale and gypsum.	Moderate to high	Suitable for most uses unless high shale content and/or limestone dissolution make it unstable for foundations.	Rockfall potential high if sandstone is undercut by dissolution; slopes unstable if high gypsum content	Fossils not present at BRCA as elsewhere	Possible Native American petroglyphs and settlements	Gypsum	Potentially in limestone rich beds	Gypsum deposits	Vugs in cliff faces may provide nesting habitat	Suitable for trails and picnic areas	See above	None documented